Defence
Safety Authority

Service inquiry

Death of a soldier from 23 Parachute Engineer Regiment at MOD Woodbridge

July 2022

Intentionally blank

Part 1.1

Covering note and glossary

Intentionally blank

Part 1.1 – Covering note

DSA/SI/03/22/WOODBRIDGE

17 August 2023

DG DSA

SERVICE INQUIRY INVESTIGATION INTO THE DEATH OF CONNOR MORRISON AT MOD WOODBRIDGE ON 23 JUL 22

1. The Service Inquiry Panel assembled at MOD Boscombe Down, on the 15 Aug 22 by order of the DG DSA for the purpose of investigating the death of Sapper Connor Morrison on 23 Jul 22 and to make recommendations in order to prevent reoccurrence. The Panel has concluded its inquiries and submits the provisional report for the Convening Authority's consideration.

2. The following inquiry papers are enclosed:

Part 1 Report	**Part 2 Record of proceedings**
Part 1.1 Covering note and glossary	Part 2.1 Diary of events
Part 1.2 Convening orders & Terms of reference	Part 2.2 List of witnesses
Part 1.3 Narrative of events	Part 2.3 Witness statements
Part 1.4 Findings	Part 2.4 List of attendees
Part 1.5 Recommendations	Part 2.5 List of exhibits
	Part 2.6 Exhibits
	Part 2.7 List of annexes
	Part 2.8 Annexes
	Part 2.9 Schedule of matters not germane to the inquiry
	Part 2.10 Master Schedule

PRESIDENT

[Signature]

[redacted]
President Woodbridge SI

MEMBERS

[Signature]

[redacted]
Member 1 Woodbridge SI

[Signature]

[redacted]
Member 2 Woodbridge SI

Intentionally blank

Glossary

Abbreviation	Term
12 Para HQ & Sp Sqn	12 Parachute Headquarters and Support Squadron
16 Air Assault BCT	16 Air Assault Brigade Combat Team
23 Para Engr Regt	23 Parachute Engineer Regiment
2IC	Second-in-Command
3 RSME	3 Royal School of Military Engineering
AAPTI	All Arms Physical Training Instructor
ABN	Army Briefing Note
ACSO	Army Command Standing Order
ADT	Annual Deficit Training
AESP	Army Equipment Support Publication
Adjt	Adjutant
AED	Automated External Defibrillator
AGAI	Army General and Administrative Instruction
AMTF	Air Manoeuvre Task Force
AOR	Area of Responsibility
APTS	Army Physical Training System
AT	Adventurous Training
BCM	Body Composition Measurement
Bde	Brigade
BMI	Body Mass Index
C2	Command and Control
CDS	Chief of Defence Staff
CESO(A)	Command Environment and Safety Officer (Army)
CFA	Commander Field Army
CGS	Chief of the General Staff
CMT	Combat Medical Technician
CO	Commanding Officer
CofC	Chain of Command
Comd HC	Commander Home Command
CPD	Continuing Professional Development
CPO	Chief Petty Officer
[redacted]	[redacted]
CT	Computed Tomography
DAIB	Defence Accident Investigation Branch
DB	Dry Bulb
DCGS	Deputy Chief of the General Staff
DCOS	Deputy Chief of Staff
DCLPA	Defence College of Logistics, Policing and Administration
DDH	Delivery Duty Holders
DG	Director General
DH	Duty Holding
DIN	Defence Instructions and Notices
DLE	Defence Learning Environment
DLW	Director Land Warfare
D Pers (A)	Director Personnel (Army)
DPHC	Defence Primary Healthcare
DSA	Defence Safety Authority
DSLA	Defence School of Logistics and Administration
DSTL	Defence Science and Technology Laboratory
ECG	Electrocardiogram

EHI	Exertional Heat Illness
EMT	Emergency Medical Technician
[redacted]	[redacted]
Ex	Exercise
FISS	Fitness Information System Software
HEMS	Helicopter Emergency Medical Services
HI	Heat Illness
HOD	Head of Department
HQ	Headquarters
INM	Institute of Naval Medicine
ITR	Individual Training Requirement
JCCC	Joint Casualty and Compassionate Centre
JRCALC	Joint Royal Colleges Ambulance Liaison Committee Clinical Guidance
JSP	Joint Service Publication
KLP	Key learning Point
LCpl	Lance Corporal
LMBCT	Light Manoeuvre Brigade Combat Team
LOM	Leading Operations Manager
LSD	Long Slow Distance
LSPTP	Lone Soldier PT Program
Maj	Major
MOD	Ministry of Defence
MPGS	Military Provost Guard Service
NASMeD	National Ambulance Service Medical Directors
NCO	Non-Commissioned Officers
NGB	National Governing Bodies
NHS	National Health Service
NOTICAS	Notification of a Casualty
OC	Officer Commanding
ODH	Operating Duty Holders
OIC	Officer-in-Charge
OPCOM	Operational Command
Para	Paratrooper
PD	Physical Development
PES	Physical Employment Standards
PT	Physical Training
PTI	Physical Training Instructor
QMSI	Quartermaster Sergeant Instructor
QT34	QUESTemp 34
QRF	Quick Response Force
RAPTC	Royal Army Physical Training Corps
Regt	Regiment
RFT	Role Fitness Test
RFT(S)	Role Fitness Test (Soldier)
RHQ	Regimental Headquarters
RMO	Regimental Medical Officer
RPE	Rate of Perceived Exertion
RPoC	Regional Point of Command
Sgt	Sergeant
SI	Service Inquiry
SMI	Sergeant Major Instructor
SNCO	Senior Non-Commissioned Officer
SO	Standing Order

Sqn	Squadron
Spr	Sapper
SQMS	Squadron Quartermaster Sergeant
SSgt	Staff Sergeant
SSI	Staff Sergeant Instructor
SSM	Squadron Sergeant Major
SST	Safe System of Training
SSW	Safe System of Work
TORs	Terms of Reference
UFTO	Unit Fitness Training Officer
WB	Wet Bulb
WBGT	Wet Bulb Globe Temperature
WBGTi	Wet Bulb Globe Temperature indoor
WBGTo	Wet Bulb Globe Temperature outdoor
Wg Cdr	Wing Commander

Intentionally blank

Part 1.2

Convening order and terms of reference

Intentionally Blank

Defence Safety Authority

Service Inquiry Convening Order

15 August 2022

SI President	Hd DAIB	DAIB Mentor
SI Members	DSA HQ Legad	DAIB Office Manager

Copy to:

PS/SofS	MA/VCDS	ASCen CS(A)
PS/Min (AF)	MA/CNS	Head DAIB
PS/Min (Lords)	MA/CGS	EA/DDC Dir
PS/Min (DPV)	PSO/CAS	DDC Head of News
PS/Min (DP)	PSO/COMD UKStratCom	DDC PR News Army
PS/PUS	MA/CFA	APSG-BAS-DACOS
PS/2PUS	DIR HS&EP	APSG-PersSvcs-BAS-SO1
DPSO/CDS	EA/DSA Dep-DG	

DSA DG/SI/03/22 – SERVICE INQUIRY INTO THE DEATH OF A SERVICE PERSON FROM 23 PARACHUTE ENGINEER REGIMENT AT HIS UNIT IN WOODBRIDGE, SUFFOLK ON 23 JULY 2022 FOLLOWING PHYSICAL TRAINING

1. In accordance with Section 343 of the Armed Forces Act 2006 and Joint Service Publication (JSP) 832 – Guide to Service Inquiries[1] and as Director General of the Defence Safety Authority (DG DSA), I have elected to convene a safety Service Inquiry (SI).

2. The purpose of this SI is to investigate the circumstances surrounding the incident and make recommendations to prevent reoccurrence.

3. The SI panel members will commence their administrative induction briefings at 1300 on Tuesday 9 August 2022 at the Defence Accident Investigation Branch (DAIB), B120 at MOD Boscombe Down. The SI will be formally convened by me at 1000 on Monday 15 August 2022.

4. The SI panel comprises 3 members:

President: [redacted]
Members:

[1] Issue 1.0 dated October 2008.

5. The Legal Advisor to the SI is [redacted]. Technical investigation/inquiry support is to be provided by the DAIB and the nominated mentor for this SI is [redacted].

6. The SI panel is to investigate and report on the facts relating to the matters specified in its Terms of Reference (TOR) at Annex A. The SI panel is to comply with its TORs and record all evidence and express opinions as directed therein. An initial report is to be submitted to me by **Monday 19 September 2022**.

7. Attendance at SI activities by advisors/observers, unless extended by the Convening Authority, is limited to the following:

Head DAIB – unrestricted attendance
DAIB investigators in their capacity as advisors to the SI panel – unrestricted attendance
Human Factors specialists in their capacity as advisors to the SI panel – unrestricted attendance

8. The SI panel will undertake its initial induction training at the DAIB facility at MOD Boscombe Down immediately after the SI's convening. Thereafter, permanent working accommodation, equipment, and assistance suitable for the nature and duration of the SI will be requested at a location decided by the SI President in due course.

9. Reasonable costs will be borne by DG DSA under [redacted].

[redacted]

S J Shell CB OBE MA
Air Marshal
DG DSA – Convening Authority

Annex:

A. Terms of Reference for the Service Inquiry into the death of a Service person from 23 Para Engineering Regiment at his unit in Woodbridge, Suffolk on 23 July 2022 following physical training.

Record of Changes

Date	Change No.	Detail	Made by

Annex A to
DSA DG/SI/03/22 Convening Order
Dated 15 August 2022

TERMS OF REFERENCE FOR THE SERVICE INQUIRY INTO THE DEATH OF A SERVICE PERSON FROM 23 PARA ENGINEERING REGIMENT AT HIS UNIT IN WOODBRIDGE, SUFFOLK ON 23 JULY 2022 FOLLOWING PHYSICAL TRAINING

1. As the nominated panel for the subject Service Inquiry (SI), you are to:

a. Investigate and, if possible, determine the cause of the incident, together with any contributory, aggravating and other factors and observations.

b. Ascertain whether Service personnel involved were acting in the course of their duties.

c. Examine what policies, orders and instructions were applicable and whether they were appropriate and complied with.

d. Review the orders and instructions surrounding unit / establishment new joiners where applicable and whether they were appropriate and complied with.

e. Establish the level of training, relevant competencies, qualifications, and currency of the individuals involved in the accident.

f. Identify if the levels of planning and preparation were commensurate with the activities' objectives, to include use and serviceability of wet bulb globe temperature monitoring equipment.

g. Review guidance received and given by command for physical training activities during the period of hot weather, and the effectiveness of promulgation of such guidance from command.

h. Review the levels of authority and supervision covering the task at the time the accident occurred.

i. Investigate and comment on relevant fatigue implications relating to the individual's activities prior to the matter under investigation and on any Human Factors that may have played a part in this accident.

j. Assess Health and Safety at Work and Environmental Protection implications in line with JSP375 and JSP418.

k. Examine previous similar incidents in order to identify wider issues and trends and to consider whether lessons identified have been actioned.

l. Report and make appropriate recommendations to the DG DSA.

2. The investigation should not seek to attribute blame and you should use JSP 832 Guide to Service Inquiries and DSA 03.10 as guidance for the conduct of your inquiry. You are to report immediately to the DG DSA should you have cause to believe a criminal or Service offence has been committed.

3. If at any stage the panel discovers something that they perceive to be a continuing hazard presenting a risk to the safety of personnel or equipment, the President should alert the DG DSA without delay to initiate remedial actions. Consideration should also be given at this time to raising an Urgent Safety[2] notice.

[2] This could be an advice or a recommendation safety note.

Intentionally blank

Part 1.3

Narrative of events

Intentionally blank

Table of contents – Part 1.3

Table of Figures

List of Tables

Part 1.3 – Narrative of events

Synopsis

1.3.1. On Thursday 21 July 2022, Sapper (Spr) Connor Morrison (referred to throughout as Spr Morrison) collapsed during a physical training (PT) session on Sutton Heath, an area immediately outside and to the south of Rock Barracks near Woodbridge in Suffolk. He was amongst a group of nine soldiers from 23 Parachute Engineer Regiment (23 Para Engr Regt) who met in accordance with orders for a steady state run[1] at the gymnasium for 08:00 that day. For the remainder of the narrative of events it will be referred to as "the run". At 08:50, during the latter stages of the PT session, Spr Morrison collapsed and was evacuated by ambulance at 10:07 to [redacted] Hospital. After a period in intensive care, he died on Saturday 23 July 2022. The Discharge Summary Notification from [redacted] Hospital recorded a main diagnosis of '[redacted]'.

Background

15 July to 23 July 2022 - arrival and activity

1.3.2. Spr Morrison completed logistic specialist trade training on Friday 15 July 2022 in Worthy Down, Hampshire and arrived at Rock Barracks, MOD Woodbridge, Suffolk the same day. He then travelled home by rail to [redacted] on Saturday 16 July 2022, returning to Rock Barracks on Sunday 17 July 2022.[2] On Monday 18 July 2022, Spr Morrison was one of two new arrivals starting their arrival process in 23 Para Engr Regt, both joining 12 Parachute Headquarters and Support Squadron (12 Para HQ & Sp Sqn).

Exhibit 1
Exhibit 2
Exhibit 3

1.3.3. 23 Para Engr Regt operated at high tempo and witnesses confirmed that the regiment was working at high intensity at the time of the incident.[3] Concurrent with Spr Morrison's arrival there were two major events underway which were the focus for much of the regiment's leadership at unit and sub-unit level. Exercise (Ex) EAGLE BUILD 4 to 29 July 2022 was a unit level exercise comprising a series of training activities to ensure that squadrons were up to date with the Air Manoeuvre Battlecraft Syllabus[4] and to ensure that all personnel were current and competent within their core trade streams. All available personnel were expected to attend.

Witness 1
Witness 2
Witness 3
Exhibit 4

1.3.4. During Ex EAGLE BUILD selected personnel were permitted a break to enable regimental teams to attend the Sapper Games in Catterick 18 to 21 July

---

[1] The term used on sub-unit orders to describe the activity and might otherwise have been described as a 'long, slow distance run'. There was no official definition of a 'steady-state run' of sufficient detail that the panel could find against which analysis could be completed. There was, however, a clear definition of a long, slow distance run including key elements of a generic lesson plan which did aide analysis of activity on 21 July 2022. Further definition and analysis of the steady state run was provided in part 1.4 analysis and findings.

[2] 16 July 2022: Spr Morrison travelled to [redacted] via [redacted]. 17 July 2022: Travelled to Woodbridge via [redacted].

[3] The Regiment's role in support of 16 Air Assault Brigade Combat Team requires them to [redacted]

[4] The Military Engineering Battlecraft Syllabus is designed to [redacted]

2022. This was a corps[5] level sporting event involving numerous sports and inter-unit competition between Corps of Royal Engineers units. 23 Para Engr Regt fully committed to this event.[6]

1.3.5. On Monday 18 July 2022 Spr Morrison reported to second-in-command (2IC) [redacted]. The troop managed the personnel induction into 23 Para Engr Regt and the 'Pegasus Pathway', delivering foundation and conditioning training to prepare candidates for 'All-Arms Pre-Parachute Selection' with Pegasus Company[7]. Witness 2 Witness 3 Witness 4 Exhibit 5

1.3.6. As a minimum, new arrivals to the unit completed the foundation phase[8] in order to ensure that they were properly inducted into the regiment, and to gain an understanding of working within airborne forces. [redacted] Therefore, Spr Morrison was moved directly to 12 Para HQ & Sp Sqn, bypassing [redacted]. He would have completed the foundation phase at a later date.

1.3.7. After an initial meeting with the squadron quartermaster sergeant (SQMS) of 12 Para HQ & Sp Sqn, Spr Morrison reported to the senior non-commissioned officer (SNCO)[9] in charge of the regiment's logistic node, his confirmed place of work. The SNCO was unaware of Spr Morrison's impending arrival until he reported for duty. The SNCO conducted an initial informal 'chat' on the understanding that a more comprehensive introduction would be completed once Spr Morrison returned from a short period of leave. From 18 to 20 July 2022 Spr Morrison commenced his arrival procedure, changed his sleeping accommodation from [redacted] to 12 Para HQ & Sp Sqn and visited the Woodbridge Medical Centre [redacted]. He did not complete any trade specific tasking or physical assessment over this period. Witness 5 Witness 6 Witness 7 Exhibit 6 Exhibit 7

1.3.8. On the evening of Tuesday 19 July 2022 Spr Morrison went to [redacted] to celebrate a friend's birthday with three other soldiers from 23 Para Engr Regt. He was reported to have been drinking in moderation and returned to Rock Barracks by midnight. Medical staff were made aware of this at the incident in case it had any impact on Spr Morrison's condition. Witnesses later confirmed in interview that Spr Morrison appeared to be unaffected by alcohol the following morning. Witness 8 Witness 9 Witness 10

1.3.9. At 08:00 on Thursday 21 July 2022, Spr Morrison was amongst a group of nine personnel from 12 Para HQ & Sp Sqn who met at the gymnasium for the run in accordance with orders. The run took place on Sutton Heath, an area immediately outside and to the south of Rock Barracks. At 08:04 the group were recorded on CCTV as they left Rock Barracks via the main gate. Witness 5 Witness 8 Witness 10-24 Exhibit 8 Exhibit 9 Exhibit 10

---

[5] Representation from across all units within the Corps of Royal Engineers.

[6] The regimental strength was 517 and of those, 230 personnel attended the Sapper Games, 175 were absent on tasking or courses and 112 remained in Rock Barracks as at 21 July 2022.

[7] All arms pre-parachute selection – Pegasus Company (P Coy) exists as a means of selecting officers and soldiers for service with British Airborne Forces. It is delivered by P Coy four times annually, and takes place at the Infantry Training Centre, Catterick.

[8] Covers air manoeuvre battlecraft, progressive PT, driver training, mandatory annual military training and airborne history.

[9] Army SNCOs included the following ranks in ascending order of seniority: sergeant, staff sergeant, warrant officer class 2 and warrant officer class 1.

1.3.10. Between 08:50 and 08:53, whilst approaching the end of the run, Spr Morrison collapsed. After receiving treatment from unit combat medical technicians (CMT)[10], civilian nurses (who were walking on Sutton Heath by coincidence), NHS ambulance paramedics and air ambulance staff, he was evacuated to [redacted] Hospital at 10:07. After a period in intensive care Spr Morrison died on Saturday 23 July 2022.

Terrain and conditions of the run route

1.3.11. **Route**. The route is illustrated in Figure 1.3.1. The group moved west from the gymnasium, followed the main road through the barracks, out of the main gate and south-west through the housing estate, crossing Heath Road onto Sutton Heath. They continued south-west, passing the sewage works, and continued towards a nearby farm. Here they turned south-east, conducting a loop around the farm's nursery fields, before pausing at the bottom of Sandy Hill to conduct a 'hill repetitions' exercise. Following the repetitions, the group continued south-east to the road junction where they turned north-east heading back towards Heath Road and the 'Green Mile'. At the junction with the Green Mile, the group turned north-west, heading towards the entrance to the housing estate. They had covered approximately 8km when Spr Morrison collapsed.

Witness 5
Witness 8
Witness 10-15
Exhibit 11-13

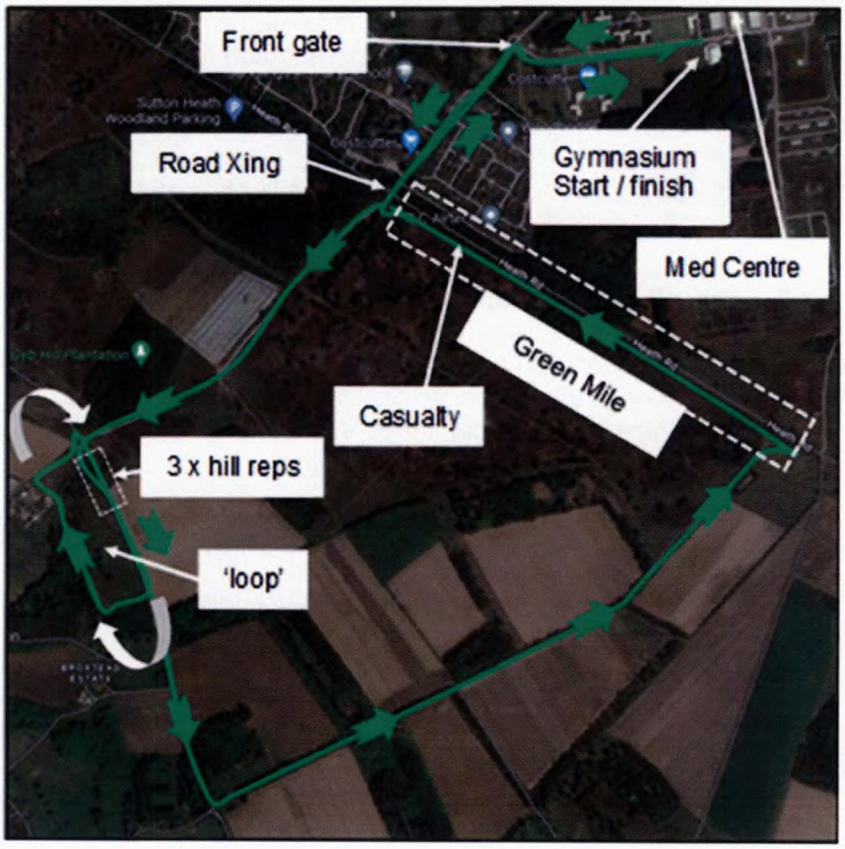

Figure 1.3.1 - Route over Sutton Heath

[10] A combat medical technician (CMT) provided first aid to injured soldiers on operations and training. They also provided first aid training to soldiers and were often deployed into garrison medical centres to support Defence Primary Healthcare (DPHC). They were, however, a unit asset and not organic to DPHC.

1.3.12. Figure 1.3.2 depicts the Green Mile and was taken at the point of collapse.

Figure 1.3.2 - The Green Mile at point of collapse

1.3.13. **Conditions**. Once across Heath Road and onto Sutton Heath the terrain changed from tarmac road to a variety of flat and undulating tracks with a mixture of gravel, hard mud and sandy surfaces. The most prominent feature was Sandy Hill, a gradual incline running for approximately 100m.[11] The loose sand at this point provided the most challenging and strenuous part of the route (see Figure 1.3.3). There was intermittent shade along the entire route.

Exhibit 220

[11] Sandy Hill was so described because it presented a shallow gradient of 3.5 degrees on loose sand for over 100m. Analysis of ordinance survey mapping showed an ascent of 7m over a horizontal distance of 112m. This presented a gradient of 3.5 degrees or 6.25%.

Figure 1.3.3 - Sandy Hill

Preparation for PT session

Orders for 21 July 2022

1.3.14. On 18 July 2022 Staff Sergeant Instructor (SSI), RAPTCI[12] (the senior physical training instructor at 23 Para Engr Regt), distributed an email to the regimental HQ and sub-unit key personnel. It directed that at 20°C and above, activity was to be conducted in accordance with work/rest tables specified within JSP375[13]. These provided guidance on safe duration of continuous work or intervals of work and rest in varying clothing and equipment, at different work rates, and in different climates. The email directed that heads of department and officers in charge (OICs) of activity reassess planned activity by consulting relevant documentation. The email further directed that PT was to be conducted by following the lone soldier PT (LSPT) direction in accordance with the LSPT programme.[14]

Exhibit 14
Exhibit 15
Exhibit 16

1.3.15. On 20 July 2022, 12 Para HQ & Sp Sqn daily Part One Orders[15] stated that personnel were to parade outside the gymnasium at 08:00 on the 21 July 2022 for a run, dressed in squadron t-shirt, shorts and trainers, and in possession of a full water bottle. The order was published on the direction of the squadron sergeant major (SSM), 12 Para HQ & Sp Sqn.

Witness 25
Witness 26
Exhibit 17

---

[12] Royal Army Physical Training Corps Instructor.

[13] Annex C to Joint Service Publication 375 chapter 41.

[14] The LSPT programme was an individual PT programme that supported the delivery of the Army Physical Training System (APTS). It was designed to be used by an individual that did not have access to a structured PT programme or spent long periods of time away from their unit on courses, leave or operations. The LSPT programme was an evidence-based, periodised 12-week programme. It was broken into 3 x 4-week blocks which progressed an individual from foundation level through resilience to specific training. Each week had 3 sessions that were to be completed in sequence.

[15] Orders that were produced daily that soldiers were to read.

All-Arms PT Instructor (AAPTI) preparedness and actions prior to commencement of the session

1.3.16. There was no nomination made on orders for a specific AAPTI[16] to run the session on Thursday 21 July 2022. By chance a Spr who was an AAPTI, was present and, there being no other qualified personnel, assumed responsibility for the session. The AAPTI had not expected to be running the session that morning and had not prepared for the event. The AAPTI did, however, have a detailed knowledge of Sutton Heath, an area used routinely by the regiment. PT preliminaries were conducted which included asking participants whether they were hydrated, whether they had eaten breakfast that morning and confirmation that they were free of injuries.

Witness 11
Witness 14
Witness 25
Exhibit 17

1.3.17. The AAPTI and a 12 Para HQ & Sp Sqn SNCO checked the conditions using the Wet Bulb Globe Temperature (WBGT) QT34 monitor[17] located at Rock Barracks gymnasium. At 08:00 on 21 July 2022 the AAPTI noted a reading of 17°C and the SSgt a reading of 16°C. Additionally, the gymnasium 2IC had recorded the WBGT reading in the daily log as 17°C as at 08:00. This was below the designated limit for carrying out PT as stated in heat warning training restrictions, the session then commenced. On 21 July 2022 the QT34 monitor was incorrectly set to "wet" and "dry" readings. However, to determine the most accurate effects of temperature a WBGT (outdoor) reading should have been taken.[18]

Witness 5
Witness 14
Witness 27
Exhibit 15
Exhibit 18

1.3.18. The temperature on Sutton Heath was reported to be significantly lower than the peak in temperature experienced during the days leading up to 21 July 2022. Further WBGT readings were taken at the gymnasium at 09:20 and recorded as wet bulb 16.9°C and dry bulb 19.3°C. No temperature recordings were taken on any part of Sutton Heath on 21 July 2022.

Witness 5
Witness 25
Exhibit 18-44

1.3.19. Army General and Administrative Instruction (AGAI) volume 1 chapter 7 directs that an OIC be nominated prior to any physical training and is then responsible for those taking part in the training.[19] There was no nomination for OIC of the PT session on 21 July 2022. None of the SNCOs present were aware of the specific role and responsibilities of an OIC with respect to unit PT. These roles were defined within the extant regimental physical development directive.[20]

Witness 5
Witness 11
Witness 14
Witness 25
Exhibit 17
Exhibit 45
Exhibit 46

---

[16] An AAPTI was not a member of the Royal Army Physical Training Corps (RAPTC). They were soldiers who had completed instructor training at the Army School of PT under the direction of RAPTC staff with an associated recorded military qualification They become qualified to delivery PT at unit level under the supervision of the RAPTC instructor but were to maintain their competence and currency.

[17] The WBGT Quest Temp 34 monitor is the only monitor approved by Defence for measured WBGT indices.

[18] Recorded heat stress indices are made available to local commanders, line managers and staff controlling physical activities so that risk assessments can be carried out and appropriate mitigation put in place to reduce the risk of heat illness. The following can be displayed: Wet, dry, globe, WBGT (outdoor) and WBGT (indoor). WBGT (indoor) = 0.7WB + 0.3G (produces "WBGTi" on the display). WBGT (outdoor) = 0.7WB + 0.2G + 0.1DB (produces as "WBGTo" on the display).

[19] AGAI volume 1, chapter 7 Physical Training, page 7-14, paragraph 7.037, published July 2021.

[20] The 23 Para Engr Regt Physical Development Directive dated 20 Oct 21 stated that 'An OIC is to be nominated prior to any physical training. The individual is to have enough military experience and judgement to be responsible for the safety of individuals during the activity. Hence, they are to be at least a Corporal but typically a Captain/Sergeant or above; the AAPTI cannot be the OIC. Prior to the activity the OIC is to be briefed by the AAPTI on the content of the training, areas of risk and their mitigations. The OIC is then responsible for those taking part in the training and making the decisions to remove those from the event that become injured or are unable to keep up.'

The participants

1.3.20. Nine personnel from 12 Para HQ & Sp Sqn attended the session; two military parachutist trained SNCOs, one lance corporal (LCpl) and six sappers, one of whom was the AAPTI mentioned previously. Two were new arrivals (one of which was Spr Morrison) who had not attended any formally organised PT with 23 Para Engr Regt prior to 21 July 2022. The group was of mixed ability ranging from parachute trained and experienced soldiers to very recent arrivals from initial trade training. This was acknowledged by one SNCO who advised the AAPTI that the session should not be too arduous with such a grouping. The new arrivals were not known by any of the NCOs present and their physical condition had not been formally assessed since their arrival at 23 Para Engr Regt.

Witness 5
Witness 8
Witness 10
Witness 11
Witness 12
Witness 13
Witness 14
Witness 15
Exhibit 7
Exhibit 47

Conduct of the session

1.3.21. This section contains a description of actions and events concerning the conduct of the run from commencement at the gymnasium at 08:00 and up to Spr Morrison's point of collapse at 08:50.

Witness 5
Witness 8
Witness 10-15

1.3.22. After a physical warm-up conducted between the gymnasium and the main gate, the group then started to increase the pace into a steady run approaching Sutton Heath. After crossing Heath Road, the group continued for approximately 1.1km until their arrival at Sandy Hill. It was reported that prior to arrival at Sandy Hill, Spr Morrison appeared to struggle to maintain the same pace as the group. He was, however, reported to have been able to sustain a conversation with a SNCO at that point.

1.3.23. Sandy Hill was approximately 100m in length. The group jogged up and then followed a loop which returned them to the foot of the hill. Again, Spr Morrison was reported to fall back off the pace during this section. At the bottom of Sandy Hill, the group rested for several minutes whilst a brief was delivered for the next element of the session. This was followed by three hill repetitions in pairs – two of them involved running facing forwards and one facing backwards in order to exercise different muscle groups. The pace of each repetition varied between pairs dependent on their own physical ability, each pair slowly making their way to the bottom of the hill between repetitions for recovery purposes.

1.3.24. After the final repetition, which culminated at the top of Sandy Hill, the group continued towards the start of the Green Mile. At that point, Spr Morrison was again reported to be struggling. During this section the SSgt gave advice to Spr Morrison on how to improve his running technique and a LCpl was assigned to encourage him. The AAPTI spoke to Spr Morrison at that point in order to confirm whether he had eaten breakfast, to assess his level of fitness and determine why he might be struggling. Spr Morrison was responsive to these questions. The AAPTI estimated Spr Morrison's rate of perceived exertion[21] to be 7 to 9, higher than might normally have been expected for the run.

Exhibit 15
Exhibit 48

[21] JSP 375, chapter 41, Policy Statement 2 States: The 'rate of perceived exertion' (RPE) scale assesses individual work rates based on physical effort. During group activities, the work rate of the activity should be determined by the highest individual RPE maintained for more than three minutes. Examples of work rate can be found in JSP 375, chapter 41, Annex C, Work/rest tables.

1.3.25. After Sandy Hill, whenever the group began to stretch apart, the AAPTI would loop the faster participants round to the back of the group in order to maintain a close grouping. This was done on several occasions throughout to ensure the faster participants remained within sight of the PTI.

1.3.26. On arrival at the start of the Green Mile the AAPTI permitted those who wanted to run faster to continue at their own best effort to the end of the track. They were directed to reform as a group and wait until all were present before crossing Heath Road prior to returning to camp and completing the session. All but the AAPTI, the LCpl and two Sprs (including Spr Morrison) took this option.

1.3.27. Whilst Spr Morrison was running the Green Mile he remained accompanied by the LCpl who had previously been assigned to encourage him. Towards the end of the Green Mile, Spr Morrison began to struggle and was seen weaving from side-to-side. At that point the LCpl told Spr Morrison to stop. Spr Morrison then started to walk before stumbling and collapsing.

Witness 13
Witness 14
Witness 16

1.3.28. The LCpl asked Spr Morrison if he was alright and if he wanted to carry on. Spr Morrison nodded and was helped to his feet by the LCpl. After taking a few more steps he collapsed for a second time. The AAPTI then also helped Spr Morrison. He and the LCpl assessed Spr Morrison and between them picked him up, one under each shoulder before being told by a passing off-duty civilian [redacted] nurse to lay him down. The incident then ensued.

Witness 12-14
Witness 17
Witness 18

1.3.29. The run was described by witnesses as slow and relaxed when compared to a more demanding organised PT session. Some participants stated that the session was the slowest they had completed in 23 Para Engr Regt.

Witness 5
Witness 8
Witness 10-15

Management of the incident

1.3.30. Management of the incident is summarised in Table 1.3.1. Listed are the actions of the run participants, two civilian nurses who were walking on Sutton Heath, regimental CMT and East of England Ambulance Service and East Anglia Air Ambulance personnel. One of the civilian nurses was an [redacted] and the other a [redacted]. Directions given by the emergency call handler are also included along with the corresponding actions taken by the civilian [redacted] nurse who initiated the call.[22]

Witness 5
Witness 11-14
Witness 16-24
Exhibit 9
Exhibit 49-52
Exhibit 233

Time	Event
08:48	Spr Morrison observed to be struggling on the run whilst another soldier was encouraging him.
08:50-08:54	Spr Morrison collapsed. The accompanying soldier did not immediately suspect heat illness but attempted to move Spr Morrison with support.

[22] In some statements it was not possible to establish a precise time. In these instances, a time bracket (~) has been recorded.

08:50-08:54	Civilian [redacted] nurse arrived at the incident immediately after Spr Morrison collapsed. The [redacted] nurse called '999' having assessed Spr Morrison to be critically ill. First aid was then initiated.
08:54	The SSgt suspected that Spr Morrison was suffering from exertional heat illness (EHI) and suggested to the [redacted] nurse that they would get some water from a nearby shop. It was the nurse's stated opinion that it was too late and this was accepted by the SSgt in deference to the nurse's greater medical experience. No water was obtained.
~ 08:56	A [redacted] nurse also witnessed the incident and stated that they assessed that Spr Morrison had overheated and then ran to fetch water. The [redacted] nurse stated that Spr Morrison was cold and did not require cooling. The [redacted] nurse stated that they deferred to the [redacted] nurse's seniority and experience.
09:00	The [redacted] nurse [redacted] on direction from the emergency call handler.
09:00-09:04	The [redacted] nurse [redacted]
09:06	Three military CMTs arrived at the incident and provided oxygen for the patient. They had been informed of the incident at the medical centre by an SNCO who was involved in the run.
09:09	East of England Ambulance Service paramedic arrived and requested the Helicopter Emergency Medical Services (HEMS) Doctor. CMTs then provided support to the paramedic. The CMTs recognised that Spr Morrison could be suffering from EHI. They did not carry out the recommended immediate action drill,[23] instead deferring to the paramedic's experience and clinical registration.
09:11	The paramedic took a tympanic temperature[24] reading of [redacted].
~ 09:15	The paramedic initiated passive cooling with the removal of Spr Morrison's T-shirt concurrent with the application of the electrocardiogram pads.
09:25	The ambulance service leading operations manager (LOM) arrived at the incident.
09:31	Heatstroke suspected and recorded. LOM initiated active cooling and Spr Morrison was then moved into the ambulance for further treatment. Water previously obtained by the [redacted] nurse and fluid from one-litre eye irrigation bottles carried in the ambulance were used to saturate a standard ambulance white sheet, which in turn was used to cover and cool Spr Morrison.

[23] As covered in JSP 950 leaflet 2-4-4 Treatment of Heat Illness.

[24] Tympanic membrane – ear drum.

09:37	The air ambulance arrived at the incident. The paramedic handed over lead responsibility to the air ambulance doctor.
09:38	The air ambulance doctor and air ambulance paramedic diagnosed heat stroke as the most likely cause and focussed their treatment accordingly.
10:01	Spr Morrison temperature was recorded as [redacted].
10:07	The land ambulance departed scene for [redacted] Hospital. The air ambulance doctor and air ambulance paramedic travelled in the land Ambulance with Spr Morrison.
10:29	The ambulance arrived at [redacted] Hospital. Spr Morrison was formally handed over to hospital staff.

Table 1.3.1 - Incident management timeline

Post-mortem examination

1.3.31. The post-mortem examination was completed on 4 August 2022 and concluded that Spr Morrison had cardiomegaly; [redacted]. The consultant histopathologist that carried out the post-mortem concluded that cardiovascular dysfunction could impair thermoregulatory responses, leading to high body temperature, and cited cardiomegaly as the cause of death, further stating that death was natural. Exhibit 53

1.3.32. **Cardiomegaly**. In the opinion of the consultant histopathologist [redacted]. Exhibit 53 Exhibit 59-61 Exhibit 195

1.3.33. **Clarification of the post-mortem findings**. Director General Defence Safety Authority wrote to the [redacted] Coroner seeking clarification of the consultant histopathologist's findings. This was as a result of a clear difference of opinion between the histopathologist and military medical experts concerning the symptoms presented by Spr Morrison on 21 July 2022 and his cause of death. This resulted in an amended post-mortem being issued dated 20 April 2023 in which the consultant histopathologist re-asserted his original findings [redacted]: Exhibit 59-61 Exhibit 195 Exhibit 225 Exhibit 227 Exhibit 228

[redacted]

1.3.34. **Military expert opinion**. A medical report covering the circumstances surrounding Spr Morrison's death was completed on 8 May 2023 which included advice from a consultant cardiologist. They concluded that heatstroke was the most likely cause of death.

Exhibit 10
Exhibit 195

1.3.35. **Differing Opinions**. On 7 July 2023, the consultant histopathologist and a military consultant in emergency medicine met to discuss their findings. A summary of their discussion and conclusion can be found in Part 1.4 Analysis and findings, along with the panel's finding.

Part 1.4

Analysis and findings

Intentionally blank

Table of contents – Part 1.4

Table of figures

List of tables

Part 1.4 – Analysis and findings

All times were British summer time.

Introduction

1.4.1. **Synopsis**. On Thursday 21 July 2022, Sapper[1] (Spr) Connor Morrison (referred to throughout as Spr Morrison) collapsed during a physical training (PT) session on Sutton Heath, an area immediately outside Rock Barracks near Woodbridge in Suffolk. He was amongst a group of nine soldiers from 23 Parachute Engineer Regiment (23 Para Engr Regt) who met in accordance with orders for a 'steady-state run' at the gymnasium for 08:00 that day. At 08:50, during the latter stages of the session, Spr Morrison collapsed and was evacuated by ambulance at 10:07 to [redacted] Hospital. After a period in intensive care, he died on Saturday 23 July 2022. The 'Discharge Summary Notification' from [redacted] Hospital recorded a main diagnosis of '[redacted][2]

1.4.2. **Group composition**. The running group was made up of the following personnel all from 12 Parachute Headquarters & Support Squadron (12 Para HQ & Sp Sqn), a subunit within 23 Para Engr Regt:

a. A staff sergeant (SSgt).

b. A sergeant (Sgt).

c. A lance corporal (LCpl).

d. An all-arms physical training instructor (AAPTI) in the rank of Sapper.

e. Five other sappers including Spr Morrison.

1.4.3. **Medical support**. The following medically trained personnel were involved in the treatment of Spr Morrison on Sutton Heath:

a. An [redacted] nurse who happened to be walking on Sutton Heath at the time of Spr Morrison's collapse.

b. A [redacted] nurse who also happened to be walking on Sutton Heath at the time of collapse.

c. Three army combat medical technicians from 23 Para Engr Regt working in Woodbridge Medical Centre.[3]

d. A paramedic and ambulance emergency medical technician from the East of England Ambulance Service.

e. Leading operations manager (LOM) from East of England Ambulance Service.

---

[1] Equated to a private rank in the Corps of Royal Engineers.

[2] The Discharge Summary Notification provided a summary of Spr Morrison's treatment and his discharge date and time from medical care following his death. The term diagnosis was used because the cause of death was a matter for the post-mortem.

[3] The CMTs were not organic to the Medical Centre; they were unit CMTs working at the medical centre as part of their unit role.

f. A critical care doctor and critical care paramedic from East Anglia Air Ambulance Service.

1.4.4. **The run**. There was no official definition of a 'steady-state run' of sufficient detail that the panel could find against which analysis of good or safe practice could be completed. There was, however, a clear definition of a 'long, slow distance run' including key elements of a generic lesson plan which aided analysis and the identification of where practice could have been improved in the circumstances presented on 21 July 2022. Areas for concern included the introduction of exercises spontaneously which didn't accord with a long, slow distance run or anything which could have been described as a steady-state. Comparisons and analysis of the run have, therefore, be made against activities as defined for a long, slow distance run in accordance with the Royal Army Physical Training Corps (RAPTC)Trainer Manual AAPTI Course. Throughout the report the activity conducted on 21 July 2022 will be referred to as the run.

1.4.5. **Exertional heat illness**. Exertional heat illness is a spectrum of illnesses, which includes heatstroke, heat exhaustion and heat cramps. It is difficult to distinguish between these conditions and they may coexist. In JSP[4] 950 leaflet 2-4-4 Exertional Heat Illness: Acute Treatment, the term exertional heat illness describes physical degradation as a result of a rise in core body temperature following exertion. Exertional heat illness in its extreme form has been termed heatstroke which can be life threatening if not recognised and treated rapidly. Heatstroke is defined as extreme hyperthermia (core body temp>40.5°C) combined with acute central nervous system (CNS) dysfunction. Heatstroke can result in multi-organ failure which may lead to death.[5] Given the circumstances surrounding Spr Morrison's death and the diagnosis of [redacted] and that his condition was life threatening, the panel have employed the term heatstroke throughout the analysis. This aligns with JSP 950 leaflet 2-4-4 and provided consistency throughout the analysis and findings.

1.4.6. **Structure**. Part 1.4 analysis and findings are presented in five distinct sections. Each contain findings which are later grouped in a summary section at the end of part 1.4:

a. **Summary of section 1 - Setting the conditions**. This section lists and analyses the factors the panel believed to have set the conditions (and what has been discounted) for Spr Morrison's collapse on 21 July 2022. In so doing it covered what actions influenced the outcome up to 08:00 when the nine soldiers met for PT at the gymnasium. It also includes a full description of Spr Morrison's pathway through training and into 23 Para Engr Regt in order to assess whether his physical condition on arrival was a factor.

b. **Summary of section 2 - Conduct of the run and prevention**. This section focusses on factors germane[6] to planning, preparation, command and control and communications. In so doing, it considers what factors were most relevant and then identifies actions that were likely to have prevented collapse or contributed to it.

[4] Joint Service Publication.

[5] JSP 950 leaflet 2-4-4 Exertional Heat Illness: Acute Treatment (version 1.3 February 2022).

[6] Germane: closely or significantly related; relevant; pertinent.

c. **Summary of section 3 - Treatment and response to the incident**. Symptoms exhibited by Spr Morrison during the run were consistent with the onset of heatstroke. In this section, factors specific to Spr Morrison's treatment from the point of collapse are considered. In so doing, treatment is analysed with JSP 950 leaflet 2-4-4 Exertional Heat Illness: Acute Treatment in mind.

d. **Summary of section 4 - Post-mortem examination**. This section compares the post-mortem findings with the expert medical opinion provided to the service inquiry panel. The section balanced respective findings and concludes that both sets of findings could co-exist, but that, on the balance of probability, Spr Morrison died of exertional heatstroke.

e. **Summary of section 5 - General observations**. Section 5 discussed Programme SALAMANDER, which aimed to provide an individualised and organisational risk assessment and management solution for heat illness prevention. The section also covered the Lone Soldier PT programme. The panel found that this was applied incorrectly; although, the Army intended to replace the programme with the My Army Fitness Application. The analysis and findings were finished with a review of recommendations pertaining to previous service inquiries that also considered exertional heat illness as a factor. This is supported by comparisons [redacted] which will enable the Defence Safety Authority to identify trends and determine further action as appropriate.

1.4.7. **Witnesses and exhibits**. It should be noted that witness and exhibit numbers are aligned with the analysis and findings not with the introductory sections.

1.4.8. **Purpose**. The purpose of this service inquiry was to investigate the circumstances surrounding the incident and to make recommendations to prevent reoccurrence. The terms of reference stated that the Woodbridge service inquiry was "into the death of a service person from 23 Para Engineer Regiment at his unit in Woodbridge, Suffolk on 23 July 2022 following physical training". Given this the panel then determined that when categorising factors, this should be done by evaluating whether any given factor ultimately influenced the outcome which was Spr Morrison's death. The factors described and discussed within this document are, therefore, categorised as causal, contributory or aggravating relative to Spr Morrison's death.

Methodology

Accident factors

1.4.9. Once an accident factor had been determined to have been present it was then assigned to one of the following categories:

a. **Causal factor(s).** 'Causal factors' are those factors which, in isolation or in combination with other causal factors and contextual details, led directly to the incident or accident. Therefore, if a causal factor was removed from the accident sequence, the accident would not have occurred.

b. **Contributory factor(s).** 'Contributory factors' are those factors which made the accident more likely to happen. That is, they did not directly cause

the accident. Therefore, if a contributory factor was removed from the accident sequence, the accident may still have occurred.

c. **Aggravating factor(s).** 'Aggravating factors' are those factors which made the final outcome of the accident worse. However, aggravating factors do not cause or contribute to the accident. That is, in the absence of the aggravating factor, the accident would still have occurred.

d. **Other factor(s).** 'Other factors' are those factors which, whilst shown to have been present, played no part in the accident in question, but are noteworthy in that they could contribute to or cause a future accident. Typically, other factors would provide the basis for additional recommendations or observations.

e. **Observations.** Observations are points or issues identified during the investigation that are worthy of note to improve working practices, but which do not relate to the accident being investigated and which could not contribute to or cause future accidents.

Accident factors modelling

1.4.10. Defence and army policies[7] directed that all activities must be conducted within the elements of a safe system of work (SSW) which put in place control measures arising from a risk assessment, to eliminate identified hazards (where possible) and to complete the work with the minimum of risk. An SSW comprised four elements: safe person, safe equipment, safe place and safe practice:[8]

a. **Safe person**. Personnel who have been given the appropriate information, instruction, training, and supervision to enable them to carry out a specific activity as a competent person with the appropriate qualification, currency, maturity, and experience.

b. **Safe equipment**. Equipment brought formally into service together with the associated documentation and underpinned by a safety case to ensure its safe use by a competent person. Where no safety case exists, any equipment hazards must form part of the activity-specific risk assessment.

c. **Safe place**. This is the space to be occupied by the military for the conduct of their activities and includes any surrounding areas together with any military or civilian population which might be affected by those activities. The safe place must form part of the activity specific risk assessment, taking into account the proposed use of the space and controls put in place.

d. **Safe practice**. The safe conduct of any activity, including those arising from the use of equipment, in a specific location, by competent persons. Safe practices are conducted in accordance with drills and instructions laid down by the service authorities and normally contained in documentation.

[7] JSP 375 volume 1 chapter 8 and ACSO 1200 The Army's Safety and Environmental Management System issued January 2021

[8] ACSO 1200 The Army's Safety and Environmental Management System issued January 2021.

1.4.11. The panel used the SSW headings to help distil the factors related to the incident and Spr Morrison's death. Once listed they were then grouped where appropriate within one of the five report sections.

Probabilistic language

1.4.12. The probabilistic terminology detailed below clarifies the terms used in this report to communicate levels of uncertainty within the report. It is designed to facilitate standardized communication of uncertainty in Defence Safety Authority accident and incident reporting.[9]

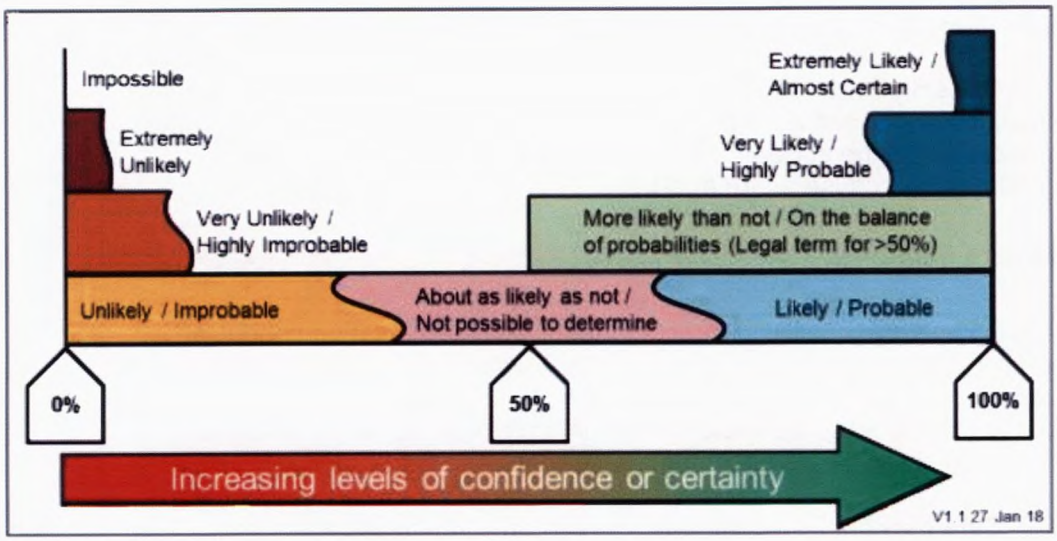

Figure 1.4.1 - Probabilistic language

Available evidence

1.4.13. The panel had access to the following evidence:

a. The Defence Accident Investigation Branch triage report and supporting evidence.

b. [redacted] Coroner's post-mortem report.

c. Medical report from a defence emergency care expert.

d. Human factors report from the principal psychologist Army HQ.

e. Spr Morrison's military medical documentation.

f. Evidence released to the panel from Suffolk Police.

g. Evidence released to the panel from [redacted] Hospital.

h. Witness recollections from East Anglia Air Ambulance personnel.

[9] SOP501 – Overview of DAIB and service inquiry reports, last reviewed 23 January 2023.

i. Witness recollections from East of England Ambulance Service personnel.

j. Witness recollections from civilian personnel involved at the scene.

k. Witness recollections from 23 Para Engr Regt personnel.

l. Witness recollections from Woodbridge Medical Centre personnel.

m. Witness recollections from 3 Royal School of Military Engineering personnel.

n. Witness recollections from Defence School of Logistics & Administration personnel.

o. Spr Morrison's basic training report.

p. Training records from 23 Para Engr Regt.

q. Physical development audit report for 23 Para Engr Regt.

r. Defence, army and unit level policy documentation including appropriate clinical guidance.

s. Defence, army and unit level orders and directives.

t. Defence Learning Environment training material.

u. NHS clinical guidance.

v. Shawcity technical report.

w. Institute of Naval Medicine technical report.

x. Programme SALAMANDER information.

Services

1.4.14. The panel was assisted by the following personnel and agencies:

a. The NHS.

b. The Met Office.

c. Defence Medical Services.

d. The Defence Accident Investigation Branch.

e. The Defence Science & Technology Laboratory.

f. The British Army.

g. The Institute of Naval Medicine (part of the RN) inclusive of Programme SALAMANDER.

h. The Defence College of Logistics, Policing and Administration.

i. Shawcity – experts in monitoring equipment.

Analysis of factors

Section 1 - Setting the conditions

Introduction

1.4.15. This section lists and analyses the factors that the panel believed to have set the conditions (and then determined what could be discounted) for Spr Morrison's collapse on 21 July 2022. In so doing it covered what actions influenced the outcome up to 08:00 when the nine soldiers met for PT at the gymnasium as ordered. It also included a full description of Spr Morrison's pathway through training and into 23 Para Engr Regt in order to assess whether his physical condition on arrival was a factor. The following factors were considered:

a. Medical history.

b. Pathway to entry into 23 Para Engr Regt.

c. Arrival management.

d. Heat illness awareness and training.

e. Unit health committee.

f. Risk assessment.

g. Audit and assurance.

h. Physical conditions.

i. Equipment.

j. Carriage of water.

k. Passage of orders and communications concerning heat illness.

l. All arms physical training instructor.

1.4.16. The panel found contributory factors relating to unit arrival processes, heat illness training, physical development audit effectiveness, carriage of water, and instructor competency. The ambient temperature on 21 July 2022 was found not to be a factor.

Medical history

1.4.17. **Entry medical.** Spr Morrison's army entry medical was completed at the Army Assessment Centre, Glencorse, on 11 November 2020, when he was 18 years old[10]. The following elements were recorded:

Exhibit 54
Exhibit 55
Exhibit 229

[10] Date of birth was 11 March 2002.

a. Weight - [redacted] kg, height - [redacted] and body mass index (BMI)[11] - [redacted].

b. The blood pressure recording at his medical [redacted] ([redacted]).

c. Spr Morrison had an electrocardiogram (ECG) as part of this initial medical. The original was not scanned into the primary care record but the attending physician identified no conditions that would have prevented Spr Morrison from entering the Army.

1.4.18. **Primary care record during service.** Spr Morrison was diagnosed with a condition in June 2021 that required several consultations with a physiotherapist. Subsequently, he completed a graded return to full physical fitness in November 2021. Spr Morrison suffered [redacted] in January 2022. No operative intervention was required. Spr Morrison's body composition measurements[12] were recorded in April and November 2021 as follows: Exhibit 55 Exhibit 56 Exhibit 57 Exhibit 58 Exhibit 110

a. 12 April 2021: weight [redacted], height [redacted], waist [redacted], BMI [redacted]

b. 16 November 2021: weight [redacted], height [redacted], waist [redacted], BMI [redacted].

1.4.19. The panel observed that Spr Morrison had gained a significant amount of weight since joining the military, particularly over the period April to November 2021, where his waist circumference increased by [redacted]. Additionally, the post-mortem examination revealed the presence [redacted] which was suggestive of truncal obesity rather than just increased lean mass. However, his BMI, although elevated, sat within the normal range and Spr Morrison subsequently passed his role fitness test (RFT) [13] on 25 January 2022. It was possible that Spr Morrison was less metabolically fit than other soldiers, but it was not possible to determine what impact Spr Morrison's weight gain had on the events of 21 July 2022 with any level of certainty. Exhibit 58 Exhibit 62 Exhibit 63 Exhibit 218 Exhibit 219

Pathway to entry into 23 Para Engr Regt

1.4.20. **Basic training**. Spr Morrison's initial training commenced on 3 January 2021 at the Army Training Centre (Pirbright) and was completed successfully on 26 March 2021. His course report states that he performed to the required standard throughout basic training and that he passed all assessments at the first attempt. Spr Morrison was considered to be 'strong on PT' and assessed to be in the top third of his cohort. No concerns were raised prior to his move to initial trade training (ITT). Exhibit 64

1.4.21. **Initial trade training**. Spr Morrison's pathway through ITT followed basic training and commenced in April 2021. It comprised two stages: combat engineer Exhibit 65

[11] BMI: The body mass index (BMI) was a measure that used height and weight to work out if a person's weight was healthy.

[12] As part of the Armed Forces weight management policy there was a requirement to provide annual assessment of the body composition of all personnel, in order to identify the level of health risk and to encourage individuals to maintain a healthy body weight - AGAI volume 1, chapter 7 Physical Training, page 7-27, paragraph 7.085, published July 2021.

[13] The Role Fitness Test Soldier (RFT (S)) was the in-Service physical employment standard for Army personnel and comprised a loaded march, fire & movement, a casualty drag and water can carry - 20221117-Core Fitness Conduct Notes_final_v2.2.

training at 3 Royal School of Military Engineering (3 RSME), and logistic specialist training at the Defence School of Logistics and Administration (DSLA).

1.4.22. **Combat engineering, 3 RSME**. Spr Morrison commenced the physically demanding combat engineer training on 11 April 2021 and progressed until diagnosed on 13 May 2021 with a condition that required physical rehabilitation. He transferred to [redacted] on 20 May 2021 for a period of rehabilitation. [redacted] held soldiers during transition between training stages, whilst awaiting course availability, as well as managing soldiers undergoing rehabilitation from injury. Spr Morrison successfully completed rehabilitation on 24 November 2021 and returned to trade training which he successfully completed on 4 February 2022. Exhibit 56 Exhibit 57 Exhibit 65

1.4.23. **Fitness test**. Spr Morrison's last recorded formal fitness assessment was the RFT on 25 January 2022 whilst in 3 RSME. This was completed despite sustaining a [redacted] injury[14] resulting from bridge building work and being instructed not to attend physical training by a doctor. The Fitness Information System Software (FISS) held a record for Spr Morrison indicating that he had passed all elements. The panel attempted to verify attendance against another source but could find no other record, section commanders were unable to conclusively confirm attendance from memory. It is, however, the panel's assumption that Spr Morrison likely completed the RFT despite his injury and a medical determination of 'unfit for military PT tests'. It is likely that Spr Morrison's section commanders would have highlighted a failure to complete such a significant course requirement. Exhibit 57 Exhibit 62

1.4.24. [redacted], **3 RSME**. Spr Morrison completed a second period in [redacted] from 7 February to 6 June 2022, after his combat engineer training. During this period, he attended driver training and maintained fitness and basic military skills prior to moving to logistic specialist training. Exhibit 65

1.4.25. **Ofsted report and** [redacted]. Ofsted inspected 3 RSME on 8 December 2021[15] at which time there were approximately 400 trainees within [redacted]. Ofsted reported that increasing numbers of trainees were spending additional time in [redacted] and that the small numbers of station medical staff were struggling to manage demand for their services. A large and unsustainable burden was placed on staff and resources, especially when trainees who were rehabilitating from injury and those who may be receiving extra coaching to pass aspects of their course were included. Exhibit 66

1.4.26. **Logistic specialist training, Defence School of Logistics and Administration.**[16] On 6 June 2022, Spr Morrison commenced logistic specialist trade training at the DSLA, Worthy Down. This was a classroom-based course with no requirement to conduct physical testing. However, fitness was maintained through regular centrally organised PT sessions designed for a mixed navy, army and air force training audience. Spr Morrison completed training on 15 July 2022 and then travelled to Rock Barracks, Woodbridge. It should be noted that Spr Morrison was assigned from 3 RSME to 23 Para Engr Regt with effect from 6 June 22. It was standard Witness 28 Exhibit 3 Exhibit 65

---

[14] [redacted].

[15] Ofsted (Office for Standards in Education) report into welfare and duty of care in Armed Forces initial training 2021 to 2022.

[16] The Defence School of Logistics and Administration is a discrete school subordinate to the Defence College of Logistics, Policing and Administration (DCLPA), that delivered training to all three single services.

practice at this time for trade training to be completed at a training unit whilst on the held strength of the receiving unit.

1.4.27. **Section commanders' perspective and supervision**. Throughout ITT Spr Morrison's progress was closely supervised and the following was determined:

a. During the combat engineering course, Spr Morrison was under the direct supervision of non-commissioned officers (NCOs)[17] who closely monitored his well-being and fitness through regular attendance at PT with trainees.

b. An instructor in 3 RSME advised Spr Morrison to work on his fitness prior to arrival at Woodbridge but was more concerned about Spr Morrison's apparent discontent at being posted to a parachute trained unit.[18] Furthermore, Spr Morrison expressed some apprehension about joining a parachute trained unit on arrival at 23 Para Engr Regt. — Witness 4, Witness 29

c. Spr Morrison's DSLA course leader confirmed that during PT, participants were not placed under the same level of physical pressure as they might encounter in the Field Army. The course leader was, however, confident that Spr Morrison could have coped with the physical challenges he would have faced in 23 Para Engr Regt. No concerns were raised about Spr Morrison's fitness for progression to the Field Army from logistic specialist training in Worthy Down. — Witness 28

d. Witnesses in both training establishments stated that Spr Morrison did not have any significant issues with fitness that would have necessitated a change of assignment or triggered fitness concerns prior to arrival at 23 Para Engr Regt. However, it should be noted that witnesses made this judgement without direct reference to any test results. As such, these assessments were subjective.

1.4.28. The panel concluded that Spr Morrison chose to attend his RFT despite being advised not to by a medical general practitioner. It was the opinion of the panel that Spr Morrison chose not to impede his progression towards completion of the combat engineering course having already experienced delay due to injury. This was an **other factor.**

1.4.29. Administrative processes did not prevent a soldier completing a challenging physical test when advised not to do so by medical staff. It was the opinion of the panel that this may have been due to the pressure [redacted] was under (as cited within the Ofsted report), which recommended 'Review the numbers of well-being and medical staff and adjust these to cope with the increasing number of trainees with mental health concerns, illnesses and injuries'.

1.4.30. The panel found that the ability to conduct a physical fitness test when advised not to do so was an **other factor.**

---

[17] These were section commanders in the rank of corporal.

[18] 16 Air Assault Brigade Combat Team [redacted] which included the arduous pre-parachute training course.

1.4.31. **Recommendation**. Commander Defence Primary Healthcare should conduct a review, in consultation with HQ Field Army, Director Land Warfare and 3 RSME, to determine (and adjust if required) whether the provision of service healthcare in the Minley area (and other phase 2 centres) is appropriate to the number and scope of Patients at Risk.

1.4.32. **Recommendation**. Director Personnel (Army) should review whether physical training policy requires updating to reinforce the checks of personnel conducted prior to physical training/testing to reduce the likelihood of personnel with injuries attempting these activities.

1.4.33. **Recommendation**. Director Land Warfare should review and update Land Warfare Centre (LWC) physical training policy (as required) to reduce the likelihood of personnel with injuries attempting physical training/testing, noting the additional personal pressures likely experienced by soldiers under training wishing to complete training without delays.

1.4.34. **Recommendation**. Director Land Warfare should review holdover[19] (scale and policy in place to manage it) across the LWC's Operations Groups to ensure supervisory care, welfare and management of soldiers and staff is appropriate.

1.4.35. The panel assessed that despite there being over five months between Spr Morrison's RFT and entry into the Field Army, he maintained a good level of physical activity and the gap did not directly increase the likelihood of exertional related conditions. There was no specific evidence presented to the panel to suggest that Spr Morrison joined 23 Para Engr Regt on 18 July 2022 in poor physical condition despite the weight gain mentioned earlier in the report. The panel concluded that a potential degradation in physical condition between an RFT and arrival at 23 Para Engr Regt was **not a factor**.

Arrival management

1.4.36. **Reporting for duty.** On 18 July 2022 Spr Morrison reported to [redacted] within 23 Para Engr Regt. The troop managed the 'Pegasus Pathway', which was the training path to completion of all-arms pre-parachute selection with Pegasus Company[20]. It delivered foundation and conditioning training to prepare candidates for all-arms pre-parachute selection which was a pre-requisite for those soldiers to become military parachutist trained. New arrivals were to complete the foundation phase as a minimum in order to ensure that they were properly inducted into the regiment. However, at the time of Spr Morrison's arrival, [redacted]. They were expected to join the foundation course later when commitments permitted.

Witness 2
Witness 3
Witness 4
Exhibit 5

1.4.37. **Fitness assessment**. A fitness assessment would have ordinarily taken place whilst in [redacted], followed by a progression towards level 3 fitness training. However, as a logistic specialist, he was assigned directly to 12 Para HQ & Sp Sqn at which point his arrival process was initiated. Aside from [redacted], a physical assessment should have been undertaken in accordance with the regimental

Witness 1
Witness 25
Witness 34
Exhibit 47

[19] Holdover is used to describe soldiers waiting to begin a training course and/or undergoing rehabilitation for injury.

[20] 'All Arms Pre-Parachute Selection (AAPPS) prepares soldiers and officers to serve with Airborne Forces. It is delivered by Pegasus Coy (P Coy) [P Company] at the Infantry Training Centre, Catterick (ITC(C)). Personnel who pass the course, and are serving with 16X, are then eligible to attend the Basic Parachute Course' (2021DIN07-093 released September 2021).

physical development directive (verbatim extract inserted below) during Spr Morrison's induction:

'**Unit PD Induction**. On arriving or returning to a unit, each unit member, regardless of rank is to undertake a physical assessment/screening as part of their unit induction using the PD Induction Form. This assessment/screening will be conducted by PTIs and will offer assurance to the CofC and dependent on results will place the individual at the correct physical training level:

Levels 1 and 2.
Unit mainstream PT, Level 3.

To allow for a safe reintegration back in to [sic] level 3 unit PTP, SP must be afforded that opportunity. Once personnel have reached the necessary review standard of the SCR they should move to Level 2 PT'.

1.4.38. Without an assessment, units will be holding unquantified risk.

1.4.39. **Management**. The management of Spr Morrison's arrival in 12 Para HQ & Sp Sqn was confused. Initially he reported to the Sqn Quartermaster Sergeant (SQMS) and then to the senior non-commissioned officer (SNCO) in-charge of the Logistic Node, his designated place of work. Neither were aware of Spr Morrison's impending arrival and were, therefore, unable to apply proactive management to his arrival process. With only a short time between arrival on 18 July 2022 and Spr Morrison's first PT session on 21 July 2022, there was insufficient opportunity for any of the senior ranks in 12 Para HQ & Sp Sqn to get to know Spr Morrison. Spr Morrison's arrival proforma shows that he did not visit the gym for an induction and did not meet with his sqn management. Relevant personnel were away from the barracks due to the Sapper Games.[21] Spr Morrison and another new arrival were left to complete their arrival process unsupervised.

Witness 1
Witness 5
Witness 6
Witness 25
Witness 35
Exhibit 6
Exhibit 7
Exhibit 69

1.4.40. Spr Morrison's arrival process was impacted by the Sapper Games and the absence of sqn management. Additionally, he did not know, or had not been briefed, on the requirement for a fitness assessment – therefore no fitness assessment took place. A lack of supervision and guidance resulted in an incomplete arrival process. Had Spr Morrison been fully informed, he would have then entered into a level 2 physical training programme and then progressed to level 3 under supervision. Had this been the case, Spr Morrison would not have attended sqn PT on 21 July 2022. The panel concluded that Spr Morrison attended a sqn PT session prior to a formal assessment, which was contrary to regimental safe working practices. This prevented the unit from gauging Spr Morrison's fitness level and made any subsequent fitness issue more likely during level 3 PT. This was, therefore, a **contributory factor.**

1.4.41. **Recommendation**. Deputy Chief of the General Staff should ensure that line managers supervise unit arrivals. They should notify them of the induction process in advance of arrival and pay particular attention to the completion of a Soldier Conditioning Review. This should include referring to the appropriate fitness assessment record for individual fitness results.

[21] This was a corps level sporting event involving numerous sports and inter-unit competition between Corps of Royal Engineers units. 23 Para Engr Regt were fully committed to this event.

Heat illness awareness and training

1.4.42. **Overview**. As at July 2022, army personnel were required to complete three training courses with heat illness content; the Army's individual training requirement online heat injury training[22], battlefield first aid training and the Defence heat illness prevention training. Additionally, lance corporals and above were required to complete risk assessment and safety management training appropriate to their rank and responsibility. Training delivery staff were also required to complete additional heat illness awareness training during the first quarter of each training year. Collectively, the MOD and the Army provided an extensive portfolio of heat illness prevention and safety training which was available to 23 Para Engr Regt personnel.

1.4.43. **Spr Morrison's heat illness awareness training**. Spr Morrison received a 40-minute 'heat injury prevention' and a 40-minute 'cold injury and heat illness' lesson during his basic training as part of the Common Military Syllabus but no further heat illness training is recorded for him. The heat injury prevention lecture was programmed on a Friday at 17:10 in a lecture theatre after a full day of activities (the morning of which was physically demanding). It is the panel's opinion that owing to likely general fatigue experienced at the end of a day's training, Spr Morrison and his fellow students may not have been fully receptive to their heat injury prevention lecture. Its enduring effect may therefore have been compromised.

Exhibit 76

1.4.44. **Individual training requirement**. The policy for the individual training requirement[23] mandates that all soldiers serving with 23 Para Engr Regt should have been in date for their online heat injury training and their battlefield casualty drills training[24], within which treatment of heatstroke casualties could be included as part of the summative assessment options.[25] Analysis of the core elements follows:

Witness 33
Exhibit 70-77
Exhibit 230

a. **Core fitness - cold and heat injury prevention**. This included the Army online heat injury training, which was mandatory for all army personnel and an annual requirement. Out of the nine participants on the PT session, only four of the soldiers, including the Sgt and AAPTI, were in-date for completing this training. The four had all completed the training on 4 April 2022. The SSgt was not in-date. Spr Morrison received heat illness training during his basic training, which concluded in April 2021 and there was no record of him completing further heat illness training. Two of the regiment's combat medical technicians (CMTs)[26] were in-date and the other was recorded by 23 Para Engr Regt as exempt, which according to policy they were not.

b. **Policy**. ACSO 3262 The Individual Training Requirement lists Battlefield Casualty Drills trainers and CMTs at regimental duty as being exempt from the core combat skills training objective of 'apply battlefield first

[22] The Army package was removed from circulation and replaced by the Defence package on 25 September 2022, so after the incident. The Army's training had a 12-month currency period.

[23] ACSO 3262 The Individual Training Requirement version 1 issued May 2022.

[24] Noting that at the time, transitional arrangements were in place for personnel still in date with Mandatory Annual Training Tests, which were replaced by the Individual Training Requirement with effect 1 April 2022. ACSO 3262 The Individual Training Requirement.

[25] Assessment took the form of a practical exercise, which included a climatic injuries scenario as part of several options to test student application of battlefield casualty management. Other assessment criteria included treating unresponsive soldiers, casualties with breathing problems, heavy bleeding, dislocated and broken bones, and burns. 20210726_ITR_Assessment_Strategy_Final_v1.pdf.

[26] A combat medical technician (CMT) provided first aid to injured soldiers on operations and training. They also provided first aid training to soldiers and were often deployed into garrison medical centres to support Defence Primary Healthcare (DPHC).

aid' owing to their higher professional qualifications, but no one is exempt from the core fitness training objective 'cold and heat injury prevention'.

c. **Core combat skills, protection - apply battlefield first aid**. Soldiers in 23 Para Engr Regt had an annual requirement to complete this training. Treatment of heat illness was one of eleven drills taught and only one of those drills was tested per student. The panel could not verify whether runners had been tested on the treatment of heat illness during their respective BCD training because relevant training records were not available. Out of the nine runners, six were in-date for this competency. The three who were not in-date had only recently joined the unit from ITT - this included Spr Morrison. The CMTs were exempt because they were working in regimental duty and were qualified to instruct in the subject[27].

1.4.45. **Defence heat illness prevention training**. Policy directed that all personnel must have completed module 1 of the Defence heat illness prevention training and that module 2 must have been completed by all commanders or line managers in advance of them commanding, managing, or planning any activity where a risk of heat illness could reasonably be expected.[28] This was accessed virtually in the Defence Learning Environment (DLE)[29]. The inquiry evidence showed that:

Exhibit 48
Exhibit 70
Exhibit 72
Exhibit 75
Exhibit 78-102

a. Despite repeated regimental direction, beginning 21 March 2022,[30] that officers and SNCOs were to complete heat illness DLE modules[31] by 5 August 2022, the Sgt had completed this training before the incident but the SSgt had not. No deadline was set for junior ranks.

b. 12 Para HQ & Sp Sqn also gave orders throughout June and in early July 2022 directing that DLE heat illness modules were to be completed by all sqn personnel by 15 July 2022. Unit training records showed that only 36 squadron personnel[32] were current on 21 July 2022. This equated to approximately 15% of the sqn's workforce and only one of the nine runners.

1.4.46. 12 Para HQ & Sp Sqn were only partially conformant with Defence heat illness prevention policy. The majority of sqn personnel did not meet the deadline set for completion of heat illness prevention training. Furthermore, only one of the run participants had completed the training prior to the incident.

1.4.47. **Safety risk management training**. Army policy[33] mandated that all non-commissioned officers, warrant officers and officers were to complete risk assessment

Exhibit 46
Exhibit 70
Exhibit 75
Exhibit 103-106

---

[27] ACSO 3262 The Individual Training Requirement, appendices 1 and 2, to annex A, version 1 issued May 2022.

[28] JSP 375 chapter 41 Heat illness prevention, page 17, paragraph 40-41, version 1.1 dated January 2022.

[29] A key component of the Defence Learning and Management Capability (DLMC) and a portal to a wide range of learning opportunities accessed online.

[30] Through regimental downward reports to the squadrons (referred to as 'Downreps'), command group meetings and regimental coordination meetings.

[31] With effect 25 September 2022, the DLE training was adopted by the Army to be part of the Individual Training Requirement. It replaced the Army's own heat illness prevention training previously developed separately to the Ministry of Defence.

[32] 1 x major; 1 x captain; 2 x warrant officer class 2; 3 x staff sergeants; 5 x sergeants; 6 x corporals; 11 x lance corporals; 7 x sappers.

[33] ABN 013/2021 Army Safety Risk Management Training updated 8 November 2021.

training[34] and part one[35] safety risk management practitioner training.[36] The training competency was valid for three years. The policy directed that only personnel who had completed all safety risk management training, as defined for their rank and responsibilities, were qualified to be an officer-in-charge (OIC)/activity owner[37] or activity deliverer. AAPTIs were qualified to produce risk assessments and advise the chain-of-command on mitigating the risk of heat illness.[38] When applied to the run participants, the following was determined:

a. Out of the three NCOs participating in the run, the Sgt was qualified and current as a safety risk practitioner.

b. The AAPTI was qualified in the production of risk assessments by virtue of his PT qualification but as a sapper, the AAPTI was not required to complete the Army's part one safety risk management practitioner training.[39]

1.4.48. The Sgt participating in the run was current as a safety risk practitioner and could have assumed the OIC role. The Sgt was qualified to discuss risk with the AAPTI and was able to dynamically assess control measures as the run progressed. However, the informal arrangement for the session on 21 July 2022 and a lack of awareness of OIC responsibilities by the SSgt and Sgt, precluded this from happening and impacted the conduct of the run, which is discussed in Section 2.

1.4.49. **Army heat illness awareness training.** The Army's climatic injury prevention policy[40] directed that unit commanders were to ensure that unit training staff undertook awareness training on the prevention of heat illness within the first three months [April, May and June] of the training year[41] and that this was to be delivered by a suitably qualified and experienced person. As a minimum, this training was to be provided to the unit training officers/warrant officers, platoon/troop commanders, physical training instructors[42] and unit individual training requirement instructors. 23 Para Engr Regt records presented to the panel were incomplete:

Exhibit 70
Exhibit 75
Exhibit 107
Exhibit 108
Exhibit 109

a. A record of heat illness awareness training for the first quarter of the 2022/23 training year could not be provided.

b. The AAPTI, SSgt and Sgt did not receive heat illness awareness training.

c. Records for the PT staff indicated that of the 13 PTIs, only four had completed heat illness and wet bulb globe temperature (WBGT) training.

---

[34] Defined safety risk management and risk assessment terms, required students to conduct a risk assessment and discuss the requirement for safe systems of work.

[35] Part 2 safety risk management leader training was for warrant officers and captains and above.

[36] General safety risk management awareness training, outlined key aspects of a positive safety culture, described how to conduct unit activities to as low as reasonably practicable risk, within risk appetite and described the Army lessons learnt process.

[37] AGAI volume 1, chapter 7 Physical Training, page 7-14, paragraph 7.038, published July 2021; ACSO 1200 The Army's Safety and Environmental Management System, chapter 4, page 74-75, paragraph 9, issued January 2021.

[38] ACSO 1207 Climatic Injury Prevention, page 8, paragraph 39, issued November 2020.

[39] ABN 013/2021 Army Safety Risk Management Training updated 8 November 2021.

[40] ACSO 1207 Climatic Injury Prevention, page 10, paragraph 41 issued November 2020.

[41] Training years ran from 1 April – 31 March.

[42] Royal Army Physical Training Corps and All-Arms Physical Training Instructors.

Those that did, had done so on 6 August 2021, nearly a year before the incident.

1.4.50. It was evident that 23 Para Engr Regt's PTIs had not fully completed army heat illness awareness training to the extent directed within policy.

1.4.51. The Army's heat illness awareness training sought the same training outcomes as its prevention training[43] but timelines for completion were different. Awareness training was to be completed within the first three months of the training year, whilst prevention training was to be completed prior to 1 April each year.[44] This and other inquiries involved physical training incidents that occurred during the months of May, June and July.[45] However, this did not have a direct impact on 21 July 2022 but was an **other factor.**

1.4.52. Since September 2022, the Army has replaced its heat illness training with the Defence heat illness prevention training modules, mandating annual completion of this training. Therefore, no recommendation has been made against the now discontinued Army heat illness awareness training.

1.4.53. **Recommendation**. Director of Defence Safety should mandate annual completion of heat illness prevention training for all uniformed Defence personnel serving in the UK and Northern Europe before and not during the summer months. Personnel, whether uniformed or civilian, serving in hot environments should continue to undertake the additional acclimatisation programme in accordance with the relevant operational requirement.

1.4.54. **Volume of online training.** Witnesses observed that the volume of mandated online training soldiers were expected to complete impacted on their ability to complete all individual courses thoroughly and to a level that genuinely changed individual behaviours. Personnel in command appointments were under pressure and reported that online training was rushed and often routinely completed outside of normal working hours. Genuine learning outcomes, therefore, were limited. Examples included the DLE hosted heat illness prevention modules and the Unit Fitness Training Officer (UFTO) course, which took a panel member approximately three hours to complete thoroughly. The panel assessed that it was more likely than not that officers would prioritise other commitments ahead of DLE training and could not allocate the time to personal online training.

Witness 2
Witness 3
Witness 35
Witness 36

1.4.55. In the opinion of the panel, training objectives for the DLE hosted heat illness prevention modules and UFTO course were considered appropriate, but delivery methods may benefit from review to ensure learning is optimised. Additionally, the volume of courses could be reviewed in order to better target the training audience, prioritise and make more efficient use of time. However, the panel concluded that delivery methods and volume of courses was an **other factor.**

---

[43] ACSO 1207 Climatic Injury Prevention, page 10, paragraph 41 issued November 2020.
[44] ACSO 1207 Climatic Injury Prevention, page 7, paragraph 37 issued November 2020.
[45] 'Deaths of three soldiers in the Brecon Beacons, Wales, in July 2013', 'death of a Royal Marine during an endurance march on 28 May 15 on Dartmoor Training Area', 'death of a soldier on 18 June 2015 in Paderborn, Germany' and 'death of a soldier during an annual fitness test at Infantry Battle School, Brecon, 19 Jul 16'.

1.4.56. **Recommendation**. The Director of Defence Safety should re-evaluate training course quantity and delivery methods to ensure that the effect of heat illness prevention training is optimised.

1.4.57. The panel found that the requirement for completion of Defence's heat illness prevention training, the Army's individual training and the Army's heat illness awareness training had not been fully met by the run's participants. This may have reduced the likelihood of an effective response to heat illness and was therefore a **contributory factor**.

1.4.58. **Recommendation**. Director Personnel (Army) should ensure that personnel do not participate in military physical training unless they are in-date for the mandated annual heat illness training. This is to be in accordance the Army's individual training requirement policy which demands that training be completed every 12 months.

Unit health committee

1.4.59. Army policy for health committees required units to conduct a quarterly health review to manage the health of the unit[46]. Objectives included the identification of activities to mitigate health risks, to ensure compliance with relevant policies, and to consolidate understanding of heat and cold injuries sustained by personnel. The policy provided a specified agenda covering the main themes and recommended unit attendees should include the RAPTC instructor and/or UFTO. The panel reviewed the 2022 first and second quarter proceedings for the 23 Para Engr Regt Quarterly Health Review. Heat and cold injuries were listed as subjects for discussion, but this was impacted by the regimental medical officer's (RMO) deployment overseas, who accessed the meeting remotely. The RMO listed incidents of climatic injuries as a percentage each quarter – 4% and 2% in quarter one and two respectively but wider discussion was likely to have been affected by poor IT connectivity. However, regimental and sqn communications did provide direction for personnel to complete heat illness training and apply preventative heat illness policy.[47] It was the panel's opinion that this fully mitigated the subject's more limited coverage during the quarterly health reviews and was, therefore, **not a factor**.

Witness 37
Exhibit 112-115

Risk assessment

1.4.60. **Policy.** JSP 375, chapter 41, policy statement 2, directed that the risk of heat illness must be considered in the risk assessment for all defence activities. The risk assessment must, as a minimum, have considered the following risk factors; acclimatisation, clothing and equipment, expected work rate, environment, individual risk factors, education and training, medical plan, fluid requirements, and body-worn heat illness monitoring equipment.[48] Army policy provided the opportunity to opt out of physical training as an additional control measure.[49]

Exhibit 48
Exhibit 116

[46] AGAI, volume 2, chapter 57, Health Committees dated September 2021, pages 57/3-5 to 57/3-6.

[47] JSP 375 chapter 41 Heat illness prevention, version 1.1 dated January 2022 and ACSO 1207 Climatic Injury Prevention issued November 2020.

[48] This was not provided to most soldiers but privately purchased equipment is often worn by personnel conducting physical training. The capability was a project within Programme SALAMANDER.

[49] AGAI volume 1, chapter 7, page 7-24, paragraph 7.078.

1.4.61. The panel noted that most of the control measures specified in the JSP 375 policy statement 2 were covered in the regiment's risk assessment for the run but made the following observations:

a. **Acclimatisation.** It would be useful to remind the reader that soldiers in the UK are **not** acclimatised. The panel found evidence that this principle was not fully understood. Misconceptions include the belief that for activities conducted within the UK, service personnel were acclimatised by default. It should be noted that troops undertaking PT in the UK are not acclimatised as explained in JSP 375 chapter 41.[50] This had no direct impact on 21 July 2022 but is an **other factor**. Exhibit 117 Exhibit 118

b. **Expected work rate.** This stated term related to the 'rate of perceived exertion' (RPE). Risk assessments for physical training must have included RPE as a control measure, which for a long, slow distance run was a RPE of 4-6 (moderate work). Only PTIs were qualified to assess RPE and that was to be made clear in risk assessments. Other control measures would then follow:

(1) In terms of AAPTI control of the run, the participants' respective RPEs would vary so running at the pace of the slowest participant would need to have been applied if only one AAPTI was present.

(2) The regiment's risk assessments accepted the use of SNCOs for duty of care purposes when the allocated instructor/student ratio exceeded the 1:15 guideline.[51] Only PTIs were qualified to assess RPE so the use of SNCOs when guideline ratios could not be achieved is not an acceptable control measure and the panel consider that this practise should cease. It was OICs who were responsible for ensuring PTIs deliver physical training safely. Exhibit 120-123

(3) Module 2 of the DLE heat illness prevention training provided the following guidance: 'Always err on the side of caution and use the **highest category maintained for more than three minutes by any individual'**. This potentially could have been another control measure within the risk assessment for a long, slow distance run. Exhibit 15 Exhibit 124

1.4.62. It was the opinion of the panel that had closer control been exercised over the group, as advised within JSP 375, a more accurate and timely assessment of RPE may have been made and this was, therefore, a **contributory factor**.

1.4.63. **Recommendation.** Director Personnel (Army) should issue guidance to ensure that control measures within physical training risk assessments include:

a. The appropriate RPE for the activity.

b. A safe PTI to student ratio.

---

[50] 'When personnel in hot environments have undergone a graded supervised programme of increasing exercise to adapt to the conditions. All personnel in the UK and Northern Europe, and those in hot environments who have not undergone a graded supervised programme of increasing exercise to adapt to the environment, are to be considered to be not acclimatised.' (JSP 375, chapter 41, part 1, version 1.1 dated January 2022).

[51] AGAI volume 1 chapter 7, annex F, page 7/F-1.

c. Training should be conducted at the highest RPE maintained for more than three minutes by any individual in accordance with work/rest tables.[52]

d. Assessments should clearly state that personnel are not acclimatised within the UK and that the appropriate work/rest table should apply.

1.4.64. **Opt-out policy**.[53] During the investigation the panel discovered an inconsistency between army and defence policy for opt-out within physical training. This was covered in army policy[54] but not within JSP 375 chapter 41. Army policy stated that: Exhibit 116

'Personnel are not to participate in physical activity of any nature where…they do not feel sufficiently well enough to take part... Units must ensure that those instructing or leading Physical Training or other military training activities involving physical activity are aware of this policy as an exertional collapse mitigation measure…the opt-out control measure must be written into all generic risk assessments that involve physical activity'.

1.4.65. It was the opinion of the panel that the opt-out section within AGAI volume 1 chapter 7 provided valuable advice but that the key messaging was diluted within a large amount of text. Additionally, opt-out policy was not covered within JSP 375 chapter 41. This had no impact on the outcome on 21 July 2022 but was an **other factor**.

1.4.66. **Recommendation**. Army Safety Group, Army Safety, Assistant Head should ensure that the ability to opt-out of physical training is communicated as routine practise, including within generic risk assessments for physical development in accordance with AGAI volume 1 chapter 7.

1.4.67. **Recommendation**. Director of Defence Safety should ensure that the ability to opt-out of physical training across defence is highlighted as an applicable control measure within JSP 375 chapter 41.

Audit and assurance

1.4.68. **Physical development audit - process**. The Army had a physical development (PD) audit regime. This consisted of unit self-assessment, followed by light[55] or full[56] audit visits by PD staff from the regional point of command (RPoC) determined by the assessment content.[57] 7 Light Mechanised Brigade Combat Team and Headquarters East was the RPoC for 23 Para Engr Regt. Self-assessment and Exhibit 125

[52] JSP 375 chapter 41 Heat illness prevention, annex C, page C-4, version 1.1 dated January 2022.

[53] AGAI volume 1 chapter 7 recognised 'that there may be times when an individual may be well enough to conduct many of their work duties whilst not feeling well enough to take part in physical activity. Personnel are not to participate in physical activity of any nature where, having been briefed on the nature of the activity by the chain of command, and they do not feel sufficiently well enough to take part, and should inform the activity owner if this is the case.'

[54] AGAI volume 1 chapter 7, page 7-24, paragraph 7.078.

[55] This was to include all the legislative elements of the standards plus any areas of policy considered critical due to the prevailing risk appetite (ACSO 9018 issued June 2021).

[56] This was to include all the legislative elements of the standards, and all policy elements as directed by defence and / or army policy, plus any other requirements, which may include physical equipment or resource inspections to qualify legislation (ACSO 9018 issued June 2021).

[57] An RPoC provided administrative support and governance for Army units within a defined area of responsibility. This included an assurance function.

full audit visits followed a prescribed question set. Self-assessment responses were analysed by RPoC PD staff to inform the operational command's annual assurance estimate. This then determined the level of the next follow-on audit, a three-year full audit cycle being the norm.[58]

1.4.69. **23 Para Engr Regt PD audit**. 23 Para Engr Regt had been subject to annual self-assessment and last had a full audit by its RPoC PD staff in 2021. The panel noted that 23 Para Engr Regt's self-assessment did not provide an accurate picture of compliance with policy. The panel identified areas of non-compliance or concern: Witness 38 Witness 39 Exhibit 126

a. A review of the regiment's PD related policy[59] revealed obsolete references. These included JSP 539 heat illness and cold injury, which had been rescinded by the MoD and replaced by JSP 375 chapters 41, heat illness prevention policy, and 42, cold injury prevention policy, and leaflets within JSP 950, medical policy.[60] Exhibit 122 Exhibit 129-131

b. The regiment's risk assessment for the run permitted the use of SNCOs to assist a PTI and mitigate the risks presented when exceeding the 1:15 instructor/student guideline ratio. The use of non-PTI qualified SNCOs was considered a safety risk because only physical training instructors were qualified to judge an individual's RPE. Exhibit 122

c. Within the unit self-assessment return for 2022[61], the unit responded to the self-assessment question 'When delivering PD (PT, Sport and AT) are all activities in line with current regulations? Ratio's, risk management, lesson plans, including National Governing Bodies (NGBs)?'. The unit answered 'Yes, all ratios are observed. Additionally, OIC PT is also employed to Risk Manage accordingly'. Whilst OICs were mentioned in the risk assessment, the panel determined that 23 Para Engr Regt had not applied OICs in PT effectively. This was not identified during the RPoC's audit but has since been fully corrected. Exhibit 127

d. AAPTIs were required by army policy to maintain a logbook for their activity. Of the thirteen logbooks examined by the panel, only four contained a record for the completion of heat illness and WBGT training which was conducted on 6 August 2021 – almost a year before the incident. Additionally, other records presented for Continuing Professional Development and Annual Deficit Training were limited. Exhibit 132-157

1.4.70. It was the panel's opinion that the unit's self-assessment was not critical enough of its own PD management. Furthermore, the full audit did not identify issues with the unit's PD documentation. More detailed scrutiny during the full audit may have improved the unit's implementation of policy and good practice relating to heat illness and AAPTI management. Audit could have discovered the need to improve PTI

---

[58] ACSO 9018 The army policy for the physical development audit in 2022 issued June 2021.

[59] 23 Para Engr Regt's Heat illness prevention policy dated 20 October 2021, Regimental Standing Orders – Orders for the Gymnasium dated 26 August 2021, lesson risk assessment for a long, slow distance run dated 8 November 2021 and lesson plan for a long, slow distance run dated July 2021.

[60] JSP 950 leaflet 2-4-4: Exertional Heat Illness: Acute Treatment (v1.3 Feb 22); leaflet 2-22-4: Heat Illness: Specialist Investigation and Rehabilitation (Feb 21 v1.1); leaflet 2-9-4: Medical Management of Cold Weather Injury (v1.0 Jun 21).

[61] Dated 25 June 2022.

assessment and training. The panel concluded that the lack of unit and RPoC scrutiny of PD records was a **contributory factor**.

1.4.71. **Advisory visits**. It was the opinion of the panel that advisory visits by the chain-of-command could also support assurance and provide a form of consultancy. They may be by invitation or initiated in response to a specific concern.[62] The HQ 16 Air Assault Brigade Combat Team Sergeant Major Instructor (SMI) did not conduct assurance-based physical training advisory visits to 23 Para Engr Regt and was not mandated to do so under policy.[63] The SMI acted as a conduit for physical training information and direction-passing down the chain-of-command to subordinate units. The SMI also provided mentorship to the brigade's physical training instructors and ensured that units completed action plans arising from RPoC audits.

Witness 39
Exhibit 158
Exhibit 159

1.4.72. It was the panel's opinion that the SMI, HQ 16 Air Assault Brigade Combat Team, could have been better utilised in the assurance process by conducting annual advisory visits for assurance purposes. This would have ensured closer alignment with the OPCOM[64] chain and complemented RPoC visits which were often likely to have been impacted by limited time and resource. The panel also believed that it was more appropriate for operationally related audit or assurance to be conducted by the OPCOM chain rather than a regional or administrative chain. This had no direct impact on the 21 July 2022 but was an **other factor**.

1.4.73. **Recommendation.** Director Resources as the Army's sponsor for ACSO 9001, army policy for audit and inspection, should reduce the reliance on unit self-assessment for physical development audits. The balance between self-assessment and formally constituted assurance visits should be reviewed to ensure key risk areas are fully addressed.

1.4.74. **Recommendation**. Director Resources as the Army's sponsor for ACSO 9001, army policy for audit and inspection, should consider greater involvement from the OPCOM chain in the assurance process to better align PD with operational matters.

Physical conditions

1.4.75. **Temperature**. Temperature readings taken at the gymnasium around the time of the incident along with Met Office recordings are listed in Table 1.4.1 below.

1.4.76. **Wet bulb globe temperature (WBGT) reading**. Recorded heat stress indices were made available to local commanders, line managers and staff controlling physical activities so that risk assessments could be carried out and appropriate mitigation put in place to reduce the risk of heat illness. One of two readings are valid: WBGT (indoor) or WBGT (outdoor). These are derived from wet bulb, dry bulb and

[62] ACSO 9001 The army policy for audit and inspection in 2022 issued June 2021.

[63] ACSO 9018 The army policy for the physical development audit in 2022 issued June 2021.

[64] Operation Command (OPCOM) is the authority granted to a commander to assign missions or tasks to subordinate commanders, to deploy units, to reassign forces, and to retain or delegate operational and/or tactical control as the commander deems necessary. It does not of itself include responsibility for administration or logistics – Allied joint doctrine publication for the conduct of operations.

globe readings provided by the QT34 monitor.[65] On 21 July 2022 WBGT (outdoor), or "WBGTo", would have been the correct reading to take.

Time (am)	Location	Temp (°C)	Appointment	Remarks	
08:00	Charsfield	18.8	Met Office	Charsfield is approximately 11km from Rock Barracks. This was a dry bulb reading.	Exhibit 160
08:00	Gymnasium, Rock Barracks	17	Gym second-in-command (2IC)	The reading was not taken from WGBTo and was therefore not suitable for risk assessments. The reading was recorded within the gymnasium temperature log and was assumed to be the highest of either "Wet" or "Dry".	Witness 27 Exhibit 18
08:00	Gymnasium, Rock Barracks	16	SSgt	A run participant. The reading was not taken from WGBTo and was therefore not suitable for risk assessments.	Witness 5
08:00	Gymnasium, Rocks Barracks	17	AAPTI	A run participant. The reading was not taken from WGBTo and was therefore not suitable for risk assessments.	Witness 14
09:00	Charsfield	19.3	Met Office	This was a dry bulb reading.	Exhibit 160
09:00	Gymnasium, Rock Barracks	19	Gym 2IC	The reading was not taken from WGBTo and was therefore not suitable for risk assessments. The reading was recorded within the gymnasium temperature log and was assumed to be the highest of either "Wet" or "Dry".	Witness 27 Exhibit 18
09:20	Gymnasium, Rock Barracks	16.9 Wet 19.3 Dry	SSgt	A run participant. The reading was not taken from WGBTo and was therefore not suitable for risk assessments.	Witness 5 Exhibit 44

Table 1.4.1 - A listing of temperature readings

1.4.77. 23 Para Engr Regt's PT programme stated that the run should be conducted within an RPE of 4-6 (out of 10) which was classified as moderate work in accordance | Exhibit 15
Exhibit 119

[65] WBGT (indoor) = 0.7WB + 0.3G (produces "WBGTi" on the display). WBGT (outdoor) = 0.7WB + 0.2G + 0.1DB (produces as "WBGTo" on the display).

with annex C to JSP 375 chapter 41 work/rest tables. At that level of exertion personnel were permitted to work for up to 240 minutes in temperatures up to 25.9°C.[66] The unit and Met Office readings were both below 20°C. Furthermore, whilst no readings were WGBTo, it was the opinion of the panel that a margin of error >5°C was unlikely. This being the case, the run conducted on 21 July 2022 was most likely within an acceptable level of risk if well managed. The panel concluded that the ambient temperature was **not a factor.** Exhibit 193

1.4.78. **Accumulated effect of high temperature**. The panel consulted the Institute of Naval Medicine (INM) concerning the accumulative effect of a sustained period of high temperature as experienced in the UK in the period leading up to 21 July 2022. The INM advised that there is evidence to suggest that a previous day of exposure and accumulation of thermal load is a risk factor for heat illness. This was identified in a systematic review that the INM undertook on individual risk factors. The INM stated that this would require strenuous exercise and a sustained elevation of core temperature. However, if an individual had stayed hydrated, had good quality sleep, and then was undertaking office work, it would have been unlikely that previous exposure would have had an impact. Exhibit 215

1.4.79. The panel found no evidence to suggest that Spr Morrison had experienced an accumulated thermal load during the days leading up to 21 July 2022. Furthermore, no evidence to suggest that his routine prior to the incident was physically demanding or overly stressful was found. Accumulated thermal load was **not a factor**.

1.4.80. **Work/rest tables.** The panel found that JSP 375 chapter 41 did not contain any examples to support a moderate level of physical training activity. Under the moderate category it listed examples such as marching at normal walking speed but nothing specific to physical training. Greater inclusion of examples such as long, slow distance run would aid planning and reduce risk. Exhibit 15

1.4.81. **Recommendation.** Director of Defence Safety should ensure that there is greater representation of routine PT (such as long, slow distance runs) within the work/rest tables provided within JSP 375 chapter 41 annex C to assist in the risk assessment of a broader range of physical activity.

1.4.82. **Terrain**. The terrain across Sutton Heath was familiar to all of the participants except the new arrivals, which included Spr Morrison. The route was mainly flat and followed tracks which varied between compacted earth and broken sand. However, Sandy Hill was so described because it presented a shallow gradient of 3.5 degrees on loose sand for over 100m.[67] It was often used for more challenging exercises such as the sprint work completed in three repetitions on 21 July 2022. The loose sand did make running more difficult for any runner, but discomfort could be minimised with careful control and management which is analysed in Section 2. Exhibit 220

[66] Extract from JSP 375 chapter 41, annex C: not acclimatised [personnel], maximum continuous exercise durations and alternative work/rest schedules permitted for a 4-hour period when wearing PT kit (shorts & t-shirt) – WBGT (°C) up to 25.9: moderate work for 240 minutes.

[67] Analysis of ordinance survey mapping showed an ascent of 7m over a horizontal distance of 112m. This presented a gradient of 3.5 degrees or 6.25%.

1.4.83. **Finding**: The panel found that if control measures such as RPE had been applied effectively then Sutton Heath's terrain would not have presented an increased level of risk. The terrain itself was therefore **not a factor**.

1.4.84. **WBGT equipment location**. The panel received advice from the INM concerning the correct placement of QT34 monitoring equipment. They reaffirmed the point made within Policy Statement 3 of JSP 375 chapter 41, that monitors should be sighted in a "representative location". The INM confirmed that there was no specific academic research commissioned by Defence to support this but stated that the guidance arose from the experience of a high incidence of heat illness on physical endurance or test events. These were often on training areas some distance from a barracks hence the guidance concerning siting and a representative location. The route used on 21 July 2022 was over 2.5km away from the Rock Barracks gymnasium at the furthest point. The gymnasium where the WBGT reading was taken was not therefore a representative point. However, for the reasons discussed, the panel found that the location of the WBGT equipment was an **other factor**. Exhibit 222 Exhibit 224

1.4.85. **Recommendation**. Director of Defence Safety should reinforce current direction concerning WBGT location and readings. For physical endurance events or activities posing a risk of heat illness, WBGT readings should be taken at the actual activity location (or key points) to be truly representative.

Equipment

1.4.86. **Wet bulb globe temperature (WBGT) equipment – QUESTemp 34 (QT34)**. The QT34 equipment[68] used for temperature readings on 21 July 2022 was taken into evidence without further usage on 24 July 2022 by the Defence Accident Investigation Branch (DAIB) triage team. It was later subjected to an inspection by Shawcity[69] and the INM. The following was reported:

a. **Damage**. A photograph taken by the DAIB triage team on 24 July 2022 showed damage to the equipment indicative of poor maintenance (see Figure 1.4.2). It shows dents in the globe, plastic protection incorrectly placed over the wet bulb and a section of plastic protection missing from the dry bulb. The instrument's calibration was in-date.[70] Exhibit 161 Exhibit 162

b. **Shawcity**. Shawcity reported that 'Calibration becomes void/irrelevant if the measurement points are damaged and/or the sensors are not used correctly. Instrument would need to restore sensors to working order and recalibrate after repair/replacements fitted'. In the opinion of Shawcity, the QT34 instrument was not fit for purpose when taken into evidence. Additionally, Shawcity downloaded and analysed all data held on the instrument. No data was present for 21 July 2022 indicating that the instrument was not set to record data. Exhibit 163

c. **Institute of Naval Medicine**. The INM completed a series of tests at a range of temperatures in controlled environments. They concluded that the Exhibit 164

[68] QT-34 asset number: TE168935.

[69] Experts in life saving monitoring equipment, including WBGT service and calibration.

[70] Calibration was completed on 6 December 2021 and therefore in-date until 6 December 2022 in accordance with annex D to JSP 375 chapter 41.

QT34 used on 21 July 2022 indicated a high reliability of measurement and was sufficiently accurate for the measurement of WBGT index temperature. This proved the *functionality* of the instrument but not the calibration of the sensors as presented on 21 July 2022.

Figure 1.4.2 - Damaged QT34 instrument

1.4.87. The condition of the QT34 instrument indicated that it was poorly maintained which is likely to have invalidated calibration. Shawcity confirmed that this was the case and despite being functional, the readings taken on 21 July 2022 could not have been considered to be accurate. The panel made the following deductions: Exhibit 15 Exhibit 163 Exhibit 165

a. The degree of accuracy could not be ascertained because no recorded data readings were available within the instrument's data set. The temperature could not be determined and therefore risk could not be assessed accurately.

b. Given the finding at paragraph 1.4.77 regarding temperature **not being a factor**, there was no causal link between QT34 maintenance and the outcome on 21 July 2022. The panel concluded that poor maintenance of a QT34 could contribute to or cause a future incident to occur and was, therefore, an **other factor.**

1.4.88. **Recommendation.** Deputy Assistant Chief of Staff Equipment, HQ Field Army, should ensure that QT34 maintenance procedures within Army are sufficiently rigorous to prevent the future use of damaged WBGT monitors.

1.4.89. **WBGT readings**. On 21 July 2022 the QT34 was set to display a reading for "Wet" and "Dry". Figure 1.4.3 is a photograph taken of the QT34 at 09:20 on 21 July 2022. The display selection was incorrect; to obtain the heat stress indices, the QT34 display must be set to "WBGTi" (for the indoor index in °C) and "WBGTo" (for the outdoor index in °C). As depicted in Figure 1.4.4, an extract from DLE heat illness prevention, module 4 – wet bulb globe temperature (WBGT) QT34 awareness, information for carrying out heat illness prevention risk assessments. The QT34 Exhibits 44 Exhibit 216

calculates the indoor and outdoor indices using the values for the wet bulb, globe and dry bulb.

Figure 1.4.3 - QT34 monitor display setting at 09:20 on 21 July 2022

Figure 1.4.4 - QT34 correct settings for indoor and outdoor

1.4.90. An incorrect reading was taken 21 July 2022. Without a reading for 'WBGTo' the outdoor heat stress index could not have been considered and could not inform a risk assessment. Thus, the AAPTI could not have been certain of the appropriate risk mitigation. The panel found that, given the finding concerning temperature **not being a factor**, there was no link between the incorrect QT34 setting and the outcome on 21 July 2022. The panel consider, however, that incorrect monitor setting could contribute to, or cause, a future occurrence and, therefore, was an **other factor.**

1.4.91. **Recommendation**. Director Personnel (Army) should assure, via the 2nd Line of Defence Assurance, that the correct wet bulb globe temperature equipment usage and currency of the PTI and wider user community is included in the ACSO 9018 question set and audit process.[71]

1.4.92. **Recommendation**. Commander Field Army and Commander Home Command should write to their subordinate chain of command reminding them of their 1st Line of Defence Assurance roles, responsibilities, authority and accountability. This

[71] 2nd Line of Defence Assurance 'provides valuable management insight into how well work is being carried out in line with set expectations, policy, and regulatory considerations'. (ACSO 4001, The policy for Army assurance, annex D, issued September 2022).

should include an emphasis on the currency of all military staff responsible for using and implementing WBGT readings as part of risk management.[72]

1.4.93. **Recommendation**. Director of Defence Safety should affirm the importance of Defence heat illness prevention training module 4 and its direct relevance to activity risk managers.

1.4.94. **WBGT guidance**. Guidance on the correct settings for the QT34 instrument was contained within the following documents:

a. Annex D to JSP 375, chapter 41 included a QT34 aide memoir but did not explain the correct setting to refer to in order to inform an activity risk assessment. The accompanying user guide in video form produced by Shawcity (and linked via JSP 375, chapter 41) did not state the correct settings either, all demonstrations in the video showed a QT34 displaying "Wet" and "Dry" not "WBGTi" and "WBGTo". Exhibit 166

b. The Army Equipment Support Publication Monitor, Thermal Environment, QT34[73] (Operating Information) was a largely technical manual. It provided clear guidance on how to operate a QT34 instrument, including navigation through the display settings. However, it did not make sufficiently clear what display setting should be read in order to obtain the indoor or outdoor indices. Exhibit 167

c. Army Command Standing Order (ACSO) No 1207 – Climatic Injury Prevention covers WBGT Monitors in a single paragraph. It covers holdings, accounting and routine maintenance and refers the reader to annex D to JSP 375, chapter 41 which as discussed, was of limited use.[74] Exhibit 168 Exhibit 169

d. Heat illness prevention training hosted on the DLE training covered the WBGT effectively in module 4. This clearly explained the heat stress indices, how they were calculated and the correct QT34 display settings. This was clearly illustrated within the aide memoire - Guide for using the QT34, WBGT monitor - hosted within the module. Exhibit 170 Exhibit 216

1.4.95. Written instructions for setting and taking the correct readings from a QT34 instrument were poor with respect to informing an activity risk assessment. The clear exception to this was module 4 of the heat illness prevention training hosted on the DLE. This was well focused on the key functions, easy to read and apply. The panel found that, given the finding concerning temperature **not being a factor,** there was no link between the incorrect QT34 written instructions and guidance and the outcome on 21 July 2022. The panel consider, however, that unclear written instructions could contribute to or cause a future incident and was, therefore, an **other factor**.

1.4.96. **Recommendation**. Director of Defence Safety and Deputy Assistant Chief of Staff, HQ Field Army, should collaboratively review the guidance covering WBGT

---

[72] 1st Line of Defence Assurance 'is carried out by, or on behalf of, the operational management that own and manage risk – the way risks are managed and controlled day-to-day. Assurance at First Line differs from Second Line in that it comes directly from those responsible for delivering specific objectives or processes (e.g. Commanding Officer checks)'. (ACSO 4001, The policy for Army assurance, annex D, issued September 2022).

[73] 6685-d-120-201 1st Edition April 2019.

[74] ACSO 1207 Climatic Injury Prevention, page 11, paragraph 46, issued November 2020.

equipment usage and maintenance to ensure that it is consistent, clear, and contains the information required by operators to inform their activity risk assessments.

Carriage of water

1.4.97. In accordance with sqn orders, participants did attend carrying water bottles. The AAPTI also confirmed verbally with participants that they were fully hydrated prior to commencing the warm-up. The AAPTI then followed what was thought to be regular practice for the run and permitted the water bottles to be left at the gym. No water was carried during the PT session. Witness 5 Witness 8 Witness 11 Witness12 Witness14 Witness15

1.4.98. This decision was not consistent with the risk assessment which stated that … 'All personnel encouraged to drink water throughout the lesson' and that … 'All personnel are to be in possession of 1 litre of water'. Given that the intent was to run at a steady pace, at a temperature below 20°C, the panel was of the opinion that water carriage was considered to be unnecessary by the AAPTI, SSgt and Sgt, having already established that all participants were fully hydrated. The result was that there was no water available throughout the course of the run. Exhibit 17 Exhibit 122

1.4.99. From the point of collapse, it became apparent that water would be needed to aid cooling (in accordance with JSP 950, leaflet 2-4-4). However, treatment for heat illness was not initiated until 31 minutes after collapse and the only fluids available were the water obtained by a [redacted] nurse who took the decision to obtain some from a local shop, and that contained within 1 litre eye irrigation bottles carried within the ambulance. Had water been immediately available amongst the group, cooling treatment may have been initiated earlier. Witness 16 Witness 24 Exhibit 49

1.4.100. With the exception of Spr Morrison, no participants exhibited the need for rehydration or expressed any concerns over personal hydration or cooling during the run. However, had water been available then rehydration, and/or cooling, might have been considered when Spr Morrison appeared to be struggling. It is not possible to determine what effect provision of water may have had on 21 July 2022, but it was the opinion of the panel that the absence of water during the run increased the likelihood of heat illness occurring and removed a fundamental method of initial treatment and was, therefore, a **contributory factor**.

1.4.101. **Recommendation**. Deputy Chief of the General Staff should ensure that units have water immediately available during physical activity. The means by which this is to be carried should be dictated by the nature of the event, the lesson plan and risk assessment, and emphasised in policy.

Passage of orders and communications concerning heat illness

1.4.102. From as early as March 2022, orders, directives and less formal communication, such as email and general unit co-ordination meetings, adequately covered the potential risks presented by heat during physical training. The passage of heat warning related communication is summarised in Table 1.4.2. This covered the period of extreme heat experienced in the UK during June and July 2022.

Level	Content
Defence	DG DSA wrote to single-Service safety leads reiterating heat illness and awareness safety advice.

Exhibit 199

Defence	Chief of Defence Staff (CDS) reminded single-Service chiefs[75] of the importance of taking measures to protect defence personnel during a period of extreme heat.	Exhibit 172
Defence	Director Health, Safety & Environmental Protection notified Defence of the revised JSP 375 chapter 41 (Heat illness prevention).	Exhibit 102
Army	Director Personnel, Army HQ outlined the Army's approach to heat injury prevention to Commander Field Army, Commander Home Command and Commander Joint Helicopter Command.[76]	Exhibit 173
Field Army	Deputy Assistant Chief of Staff Risk, HQ Field Army, issued a directive to unit commanding officers and delivery duty holders (DDHs)[77] instructing them to review activity risk assessments in relation to heat injury hazards from 15 July 2022.	Exhibit 174
Formation	HQ 16 Air Assault Brigade Combat Team [78] issued heat warnings for the period 8 – 15 July 2022 linked to a complete list of current policy and heat illness prevention training requirements.	Exhibit 176
Formation	HQ 7 Light Mechanised Brigade Combat Team & HQ East[79] issued a DOWNREP[80] reminding units in their area of responsibility of the requirement to complete heat illness prevention training.	Exhibit 177
Unit	23 Para Engr Regt echoed formation level direction concerning the risks presented by heat and the requirement for personnel to complete heat illness prevention training, for the summer in question, via unit command groups and email from Regt HQ and the RAPTC staff sergeant instructor. Links to all associated policy were included in direction to sub-units including, 12 Para HQ & Sp Sqn. From 24 March 2022 onwards direction was given to complete heat illness online training. This was directed at commanders or line managers in advance of them commanding, managing, or planning any activity where a risk of heat illness could reasonably be expected.	Exhibit 78-102 Exhibit 186

Table 1.4.2 - Summary of orders and communications

1.4.103. There were no deficiencies in the orders and directives cascaded from defence, army and formation level covering heat related warnings. Unit level direction and promulgation was also effective; subunits received the necessary warnings and

---

[75] 1st Sea Lord, Chief of the General Staff, and Chief of the Air Staff.

[76] Commanders ultimately responsible for the training and wellbeing of Army personnel.

[77] A revised risk-based Army duty holding (DH) model supported by training was effective from January 21. This ensured that DH continued to apply to Army activity, but only in certain, defined circumstances based on the level of risk exposure. The level at which DH applied was determined by the 1* (DDHs) and 3* (operating duty holders – (ODH)) in consultation with COs and 2* formation commanders. There was no change to the fundamental duty of care requirement owed to all Army personnel by their chain of command.

[78] 23 Para Engr Regt was one of 16 Air Assault Brigade Combat Team's force elements (units) and was under their operational command. Force elements were held at [redacted]

[79] HQ Light Mechanised Brigade Combat Team and HQ East fulfilled a role as a regional point of command which included administrative support to units in the east of England. This included assurance of unit performance across administration, logistics and physical training.

[80] A DOWNREP was a daily routine report from a commander to subordinate commanders or units.

direction. It was the opinion of the panel that the distribution of orders and directives was **not a factor**.

1.4.104. The SMI HQ 16 Air Assault Brigade Combat Team provided a heat warning for the week 8 to 15 July 2022 by email to brigade units. It contained a comprehensive list of supporting guidance and directed that control measures should be applied for activities conducted when temperatures were above 20°C – the point at which work/rest tables applied in accordance with JSP 375. The SMI also stated 'that all HoDs[81] and activity OICs must reassess planned activity by consulting the following documentation' – a list of the heat illness prevention related documents.[82] The panel confirmed that the staff sergeant instructor (SSI) 23 Para Engr Regt received the email. Exhibit 176

1.4.105. On 11 July 2022, the SSI 23 Para Engr Regt extracted the content from 16 Air Assault Brigade Combat Team's warning. The SSI then issued a warning, covering the period 11 to 17 July 2022, internally to regimental subunits. This was replicated on regimental part one and 12 Para HQ & Sp Sqn orders.[83] Exhibit 178-186

1.4.106. On 18 July 2022, SSI 23 Para Engr Regt sent further direction which replicated the content of the HQ 16 Air Assault Brigade Combat Team warning once more. The SSI again directed that control measures should be applied for activities above 20°C. This included the statement 'All HoDs and activity OICs must reassess planned activity by consulting the following documentation and Sqns PT will be conducting by following the Lone soldier PT' [sic]. The email was received by Squadron Sergeant Major (SSM) 12 Para HQ & Sp Sqn, but the content was not repeated on squadron orders, therefore, run participants were not able to assimilate it in advance. Exhibit 16

1.4.107. On 20 July 2022, SSM 12 Para HQ & Sp Sqn reviewed the regimental PT programme. This stated that 12 Para HQ & Sp Sqn personnel were to conduct 'Tactical PT and conditioning'. This lesson had a specified RPE of 7-8 and would have been of greater intensity than the run. The SSM downgraded this PT session to a 'steady-state run' due to significant numbers of personnel being absent at the Sapper Games. Witness 25 Exhibit 119

1.4.108. It was reasonable for the SSM to have given direction for some form of PT to take place on 21 July 2022. The SSM had made reference to what was considered to be the in-date programme but changed the activity to allow for fewer available personnel. Additionally, the email from the SSI sent on 18 July 2022 did not put an absolute stop to any form of PT. The SSM interpreted the email as allowing PT to go ahead at temperatures below 20°C which was consistent with work/rest tables within JSP 375 chapter 41. On 21 July 2022, the SSM considered PT to be permissible. The panel concluded that the occurrence of a squadron PT session on 21 July 2022 was **not a factor.**

[81] Head of Department (HoD).

[82] JSP 375 chapter 41: annex A – commander's guide; annex B – individual's heat illness guide; annex C – Work/Rest Tables; annex F – hydration guidance; and ACSO 1207 – Climatic Injury Prevention.

[83] Part 1 orders were the formal way in which direction and notifications were issued to army personnel in army units.

All arms physical training instructor (AAPTI)

1.4.109. **Currency and competence**. The AAPTI did not have a physical training instructor electronic logbook but did have a hard copy logbook which was no longer current in accordance with army policy.[84] Strictly in accordance with policy[85] the AAPTI was not current and competent to deliver physical training. The AAPTI delivered a physical training session on 23 May 2022 which was considered to be below the standard required. This was acted upon by the SSI who discussed the AAPTI's performance with the former SSM of 12 Para HQ & Sp Sqn soon after. It is the panel's understanding that the AAPTI required further mentoring in order to improve his performance. However, no further mentoring took place and the AAPTI continued to deliver PT sessions without supervision. On 21 July 2022, SSM 12 Para HQ & Sp Sqn was not aware that the AAPTI required further mentoring and continued to employ him as an AAPTI.

Witness 14
Witness 25
Witness 34
Exhibit 175
Exhibit 190
Exhibit 191
Exhibit 221

1.4.110. **Instructor community**. The AAPTI did not operate within the regiment's PTI community. Information concerning physical training within the PTI cohort was cascaded via the AAPTIs' social network using the Signal application.[86] This included instructions for PT delivery and opportunities to run sessions. The AAPTI was not a member of this means of PT specific co-ordination.

Witness 14
Witness 34

1.4.111. **AAPTI functional management**. The functional management for the regiment's PTIs was the responsibility of the SSI. The panel identified two other AAPTIs within the regiment who were not being monitored by the SSI. Whilst one was not delivering physical training, the other had been observed delivering physical training when no other AAPTIs were available. Whilst neither of their logbooks had been reviewed by the SSI, the panel considered that it was unlikely that they were current and competent to deliver physical training.

1.4.112. In terms of conducting PT, the AAPTI was not effectively managed. The lack of a current logbook indicated that no progressive training or mentoring had taken place. A requirement for mentoring identified in May 2022 was not followed up and 12 Para HQ & Sp Sqn's leadership were not cognisant of the AAPTI's limitations on 21 July 2022. It was the opinion of the panel that, with no formal contact with the wider PTI community, the AAPTI would have felt less motivated to sustain or develop physical development skills. The panel concluded that a lack of supervision and professional development rendered the AAPTI less able to run the PT session and was, therefore, a **contributory factor.**

1.4.113. **Recommendation**. Director Personnel (Army) should assure that only physical training instructors that are current and competent are allowed to lead physical training sessions.

---

[84] The last recorded physical training activity within the physical logbook was January 2020 which was countersigned by the AAPTI's line manager.

[85] AGAI volume 1, chapter 7 Physical Training published July 2021; ABN 078/2021 Introduction of an electronic logbook, physical training instructors, published July 2021.

[86] Signal was an encrypted messaging service for instant messaging, voice, and video calls.

Section 2 - Conduct of the run

Introduction

1.4.114. Having considered the conditions set out in section 1, this section focusses on factors germane to planning, preparation, command, control and communications. In so doing, it considers what factors were most relevant when identifying actions likely to have prevented the collapse or contributed to it. Factors concerning the management of the incident, from the point of collapse onwards, are covered in section 3. The following areas have been considered in this section:

a. Planning and preparation including:

(1) AAPTI nomination.

(2) Effect of Sandy Hill.

(3) Rate of perceived exertion.

(4) Knowledge of Spr Morrison and fatigue.

(5) Individual drive.

(6) Heat checklist.

b. Command and control including:

(1) OIC for physical training.

(2) Management of the run.

c. Communications.

1.4.115. The panel found no causal or aggravating factors within section 2 but found factors concerning lesson planning, the application or understanding of rate of perceived exertion, individual drive, and a lack of understanding of the OIC's role to be contributory.

Planning and preparation

1.4.116. **AAPTI nomination.** The AAPTI had not been nominated prior to the group from 12 Para HQ & Sp Sqn meeting for PT at 08:00 and only took control of the session once it was realised that there was only one participant holding an AAPTI qualification.[87] At this point, the AAPTI was leading the run but was not current and competent in accordance with army policy. The following resulted from this situation:

Witness 5
Witness 11
Witness 14
Exhibit 17
Exhibit 131
Exhibit 187
Exhibit 192

a. No planning took place. The AAPTI had to depend on previous lessons, experience and knowledge of Sutton Heath. The AAPTI was, therefore, unable to adequately take into consideration the varying abilities of

[87] Whilst the AAPTI was assessed to have not been current or competent, his AAPTI qualification was valid for 10 years as per ABN 58/17: Change to duration of All Arms Physical Training Qualification and introduction of a PTI logbook.

the group and could not have been expected to understand the capabilities of Spr Morrison.

b. No structured lesson plan for the run was followed which resulted in ad-hoc management of the session. PTIs had the ability to utilise the Army Physical Training School Management Tool, which helped them create lesson plans to meet the needs of the lesson.

c. A lesson plan existed but contained generic options for activities to be conducted within a long, slow distance run. In this situation the AAPTI did not have the opportunity to refer to it in advance.

d. The lack of time to plan deprived the AAPTI of an opportunity to fully consider the composition of the group and structure the session accordingly.

1.4.117. Having been unable to compile a lesson plan for the session, or refer to the existing plan, the AAPTI was unable to fully consider the key factors to suit the circumstances of 21 July 2022. In the opinion of the panel, had the AAPTI had the opportunity to do so, it may have triggered more thought about the composition of the group and, therefore, it would have been less likely that difficulties or complications could have arisen. The panel concluded that the lack of time and opportunity for the AAPTI to plan the lesson was a **contributory factor**.

1.4.118. **Recommendation**. Director Personnel (Army) should ensure that physical development lessons are not conducted unless the nominated PTI has had sufficient opportunity to prepare a lesson plan and that it has been reviewed by the activity OIC.

1.4.119. **Heat checklist.** The panel was provided with evidence indicating that a commander's heat checklist was signed after the incident on the same day. This was retrospective and, therefore, could not have been considered within any planning activity. Had the heat checklist been available and discussed between an OIC and AAPTI before the activity commenced, then both would have been better equipped to conduct a dynamic risk assessment of Spr Morrison's condition and provide potentially early intervention. The panel concluded that the lack of a formal checklist linked to roles was a **contributory factor**.

Exhibit 194

1.4.120. **Recommendation**. Director Personnel (Army) should ensure that PD risk assessments, lesson plans and OIC checklists include checks to reduce the risk of heat injuries. Prior to the activity commencing, these documents should be reviewed by physical training instructors delivering each session and activity OICs responsible for ensuring that safe training is conducted.

1.4.121. **Effect of Sandy Hill**. With insufficient opportunity to plan and refer to a lesson plan, the AAPTI spontaneously utilised Sandy Hill to vary activity. Three repetitions of sprints at individual best-effort up a shallow gradient on a sandy surface deviated from the approach required for the run at 70% maximum heart rate as specified in the regiment's lesson plan. It was probable that participant's RPE would have been elevated as a result, which made the need to dynamically risk assess participants more important.

Witness 5
Witness 8
Witness 10-15
Exhibit 131

1.4.122. **Rate of perceived exertion**. The RPE was defined for the run in the regiment's PT plan as 4-6 and classified as moderate work.[88] However, this was not considered in advance and no explanation of how this might have been applied as an effective control measure was provided. During interview, the AAPTI provided an assessment of Spr Morrison's RPE ranging from 7 to 9 beyond Sandy Hill. The AAPTI acknowledged that this was higher than might normally be expected. The AAPTI confirmed that Spr Morrison had been engaged in discussion and recognised that he was having to work at a high RPE. The AAPTI allowed Spr Morrison to remain at the back of the group. Spr Morrison was not stopped and continued despite an estimated RPE of 7 to 9. This was an opportunity to apply dynamic risk assessment and intervene to reduce Spr Morrison's RPE to a level commensurate with the run.

Witness 14
Exhibit 15
Exhibit 119
Exhibit 189
Exhibit 193

1.4.123. ACSO 1200 provided the guidance that 'Dynamic Risk Assessments shall be conducted before commencing an activity and throughout its conduct to ensure the RA [risk assessment] controls and SSW [safe systems of work] still apply'.[89]

Exhibit 223
Exhibit 226

1.4.124. **Knowledge of Spr Morrison and fatigue.** Run participants did not identify the risk presented by apparent fatigue when Spr Morrison was seen to be struggling. However, both SNCOs participating witnessed clear signs of fatigue in him - one soon after crossing Heath Road and another later after Sandy Hill when Spr Morrison was given advice on his running style by an SNCO. This was early into the session and could have triggered greater attention. Spr Morrison was said to be falling behind and although communicating, it was not in full sentences. This was indicative of a potentially high RPE and consistent with what the AAPTI had observed. An SNCO commented that they advised Spr Morrison that he would find it easier to run if he lowered his arms and improve his running style. Neither SNCO knew Spr Morrison so, through no fault of their own, could make no judgement as to his normal performance level.

Witness 5
Witness 11
Witness 14
Exhibit 187

1.4.125. **Individual drive**. AGAI volume 1 chapter 7 explains that excessive motivation is equally important to recognise as a risk factor, as an individual can push themselves during physical activity and ignore the onset of physical signs and symptoms of distress. It was evident that Spr Morrison was well motivated but concerned about his personal fitness. Whilst training in 3 RSME, Spr Morrison's section commander warned him amongst others that they were not up to the physical standard required for service in 23 Para Engr Regt. His section commander also confirmed that Spr Morrison had voiced some discontentment at being assigned to 23 Para Engr Regt. Additionally, another witness confirmed that Spr Morrison was apprehensive about the fitness standards that would have been required in 23 Para Engr Regt on his arrival. They also stated that Spr Morrison was taking steps to improve his personal fitness. This impression was consistent with a personal performance profile in which Spr Morrison [redacted][90] In the opinion of the panel, it was probable that Spr Morrison's individual drive ([redacted]) was high due to not wanting to create a poor impression in a regiment with a strong reputation for fitness.

Witness 4
Witness 29
Exhibit 67
Exhibit 68
Exhibit 116

[88] JSP 375 chapter 41, annex C – Work/Rest Tables, version 1.1. dated January 2022.

[89] ACSO 1200 paragraph 7e: 'Dynamic risk assessment is the process used to supervise, monitor, change or stop activity even where it is being delivered.'

[90] Motivation, team player, willingness to learn, enthusiasm, physically fit, mentally fit, determination, communication, leadership and confidence.

1.4.126. Spr Morrison's RPE was assessed to be at an RPE of 7 to 9 - higher than what was expected from the run but consistent with the increased physical intensity at Sandy Hill. Intervention at this point may have reduced the likelihood of collapse. The panel considered that a high RPE and the lack of proactive intervention were both **contributory factors**.

1.4.127. In the opinion of the panel, it was also probable that Spr Morrison was anxious/apprehensive about serving in his new unit which may have increased his individual drive to continue at a high RPE rather than reduce effort. This could have exacerbated the situation. The panel concluded that Spr Morrison's individual drive to complete the activity was a **contributory factor**.

1.4.128. **Recommendation.** Director Personnel (Army) should review and amend the policy direction and guidance on RPE in AGAI volume 1 chapter 7 (to complement DLE Defence heat illness prevention training module 2 learning), so that practitioners, such as PTIs and OICs, fully understand the application of RPE as a risk control measure.

1.4.129. **Recommendation**. Deputy Chief of the General Staff should remind the chain of command that all-arms PTIs and activity OICs must have a clear understanding of RPE and the potential effect of participant's individual drive. To that end, DLE heat illness prevention training module 2 must be well understood by the Army's junior commanders.

Command and Control (C2)

1.4.130. **OIC for physical training**. On 26 September 2016, Deputy Chief of the General Staff sent direction[91] to both Commander Field Army and Commander Home Command concerning physical training responsibilities. This included the direction on OICs responsibilities and stated:

Exhibit 45
Exhibit 46
Exhibit 123

'An OIC is to be nominated prior to any physical training. That individual is to have sufficient military experience and judgement to be responsible for the safety of individuals during the activity. Hence, they are to be at least a Corporal but typically a Captain/Sergeant or above; the PTI cannot be the OIC. Prior to the activity the OIC is to be briefed by the PTI on the content of the training, areas of risk and their mitigations. The OIC is then responsible for those taking part in the training and making the decisions to remove those from the event who become injured or are unable to keep up. They must stop the training at any stage if they believe it is not safe to continue'.

DCGS's direction was referenced as a footnote within AGAI volume 1 chapter 7[92] and was explicitly replicated within 23 Para Engr Regt's Physical Development Directive dated 20 October 2021.

1.4.131. JSP 375 chapter 41 was applicable across all three Services. It used the term 'commander' rather than OIC and defined the role as 'any military personnel responsible for planning activities, supervising activities, and making sure personnel are safe. This term refers to a role rather than the rank of commander'. JSP 375 was

Exhibit 48
Exhibit 118

[91] DCGS/09_26 dated 26 September 2016. A Loose minute to Commander Field Army and Commander Home Command – Physical Training Responsibilities.

[92] AGAI volume 1, chapter 7 Physical Training, page 7-14, paragraph 7.037, published July 2021.

specific about the commander's responsibilities with respect to heat illness and listed the following:

a. 'The commander must be nominated and known by all participants'.

b. 'Heat illness is to be considered in the risk assessments'.

c. 'WBGT and work rest table to be used to inform the risk assessment'.

d. 'The controls in the risk assessment must be complied with'.

e. 'All activity must be dynamically risk managed. If heat illness symptoms are observed the activity must be paused, must be dynamically risk assessed and further control measures must be applied, only to be restarted once control measures have been applied'.

f. 'Those involved in planning or undertaking activities which involve risk of heat illness must receive suitable training'.

1.4.132. The SSM confirmed that no OIC nomination had been made for the activity on 21 July 2022. Additionally, witnesses (including the SSM) confirmed that they had no awareness or understanding of an OIC for a physical activity despite it being clearly defined within the regiment's physical development directive. The run was managed by the AAPTI without any formalised support from an OIC, however, the SNCOs assisted the AAPTI when Spr Morrison was observed to be struggling. This lack of understanding has since been fully rectified by 23 Para Engr Regt with the implementation of an OIC checklist detailing a full set of responsibilities. Having received only a brief introduction on his arrival, Spr Morrison was not well known to either of the participating SNCOs who might otherwise have expected to be the OIC on 21 July 2022. He also exhibited signs of physical stress early in the run and soon after the completion of hill repetitions on Sandy Hill; however, this triggered no significant intervention.

Witness 1
Witness 2
Witness 5
Witness 11
Witness 25

1.4.133. In the opinion of the panel, had either SNCO been nominated as an OIC and been fully conversant with the responsibilities as listed in JSP 375, they may have intervened to deal with the developing situation earlier and more assertively. It is also likely that both SNCOs would have taken a greater interest in Spr Morrison as a new arrival, been more conscious of the risks and discussed whether a PT induction had been completed. It was the opinion of the panel that the lack of appointment of an OIC, and the associated understanding of an OIC's responsibilities, made the outcome more likely and was, therefore, a **contributory factor**.

Witness 5
Witness 11
Exhibit 48
Exhibit 187

1.4.134. The panel **observed** that, during the course of the inquiry, 23 Para Engr Regt's subsequent OIC checklist was found to be an example of good practice and has already been adopted within 16 Air Assault Brigade Combat Team.

Exhibit 188

1.4.135. **Recommendation**. Deputy Chief of the General Staff should strongly re-emphasise direction given in 2016 regarding the role of an activity OIC and take the opportunity to include appropriate instruction on leadership courses for officers and other ranks. This should be supported by a checklist (or similar) which details OIC responsibilities for a particular physical activity.

1.4.136. **Management of the run.** It was important to consider the management of the run when assessing Spr Morrison's performance and progression towards the

point of collapse. For analysis, the panel broke the run route down into seven discrete stages which are illustrated in Figure 1.4.5 and listed in Table 1.4.3:

Exhibit 11

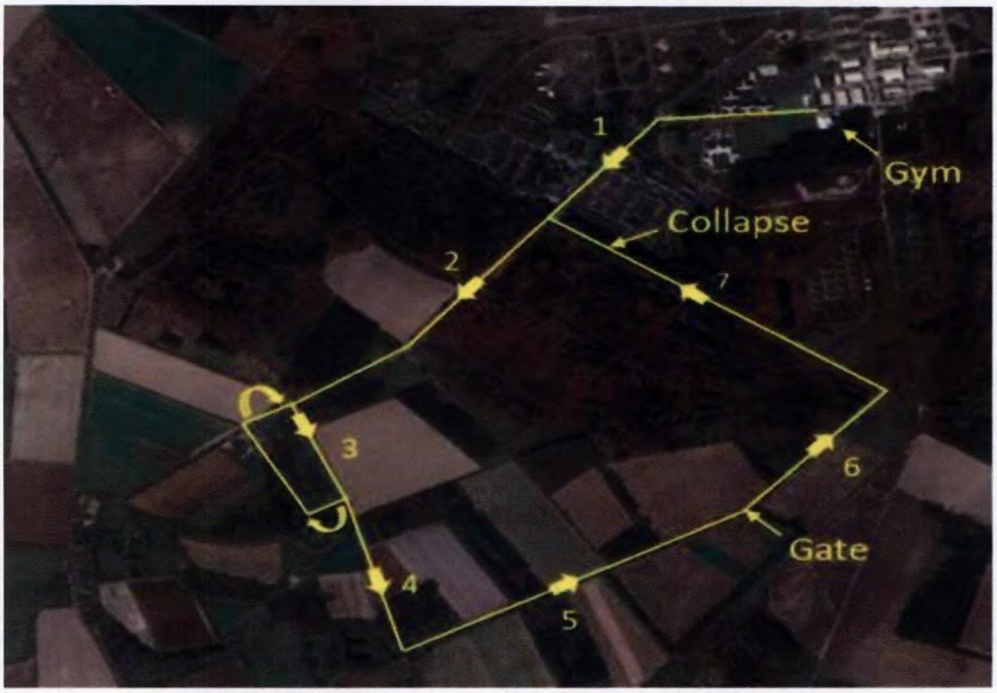

Figure 1.4.5 - An illustration of run stages

Stage	Location	Description	Performance
1.	Warm-up from gym to Heath Road.	After a physical warm-up conducted between the gym and the main gate, the group then started to increase the pace into a steady run from the gate approaching Sutton Heath.	CCTV shows the group together as they departed camp through Rock Barracks main gate.
2.	Approach to Sandy Hill.	After crossing Heath Road, the group continued for approximately 1.1km until their arrival at Sandy Hill.	It was reported that prior to arrival at Sandy Hill, Spr Morrison appeared to struggle to maintain the same pace as the group. He was, however, reported to have been able to sustain a conversation with an SNCO at this point.
3.	Sandy Hill and the loop.	Sandy Hill was approximately 100m in length. The group jogged up and then followed a loop which returned them to the foot of the hill.	Spr Morrison was reported to be struggling to maintain the pace during this section.
4.	Repetitions on Sandy Hill.	- At the bottom of Sandy Hill, the group rested for a few minutes whilst a brief was delivered for the next element	The pace of each repetition varied between pairs dependent on their own ability, each pair slowly

Witness 5
Witness 8
Witness 10
Witness 11
Witness 12
Witness 13
Witness 14
Witness 15
Witness 16
Witness 17
Witness 18
Exhibit 8

		of the session. - This was followed by three hill repetitions in pairs – two of them involved running facing forwards and one facing backwards to exercise different muscle groups.	making their way to the bottom of the hill between repetitions for recovery purposes.
5.	Sandy Hill to gate.	- After the final repetition, which culminated at the top of Sandy Hill, the group continued towards the gate. - The squad had split into two halves, a 20 – 30m separation developed. - Faster runners were allowed to pace themselves but stayed within sight of the AAPTI, doubling back to the slower group. - The AAPTI spoke to Spr Morrison at this point in order to confirm whether he had eaten breakfast, to assess his level of fitness and determine why he might be struggling. - Spr Morrison was paired with another Spr (also a new arrival). The AAPTI remained with the slower participants.	- Witnesses reported that whilst running at slower pace, Spr Morrison continued to struggle but was responsive to questions. - The AAPTI estimated Spr Morrison's RPE to be 7 to 9, higher than might normally have been expected for a steady state run. - During this section an SNCO gave advice to Spr Morrison on how to improve his running technique and a LCpl was assigned to encourage him.
6.	Gate to the Green Mile.	After pausing whilst the gate was opened to allow the group to file-through they continued to the Green Mile.	Spr Morrison and another slower runner were reported to be at the back as the group filed through the gate.
7.	Green Mile to collapse.	- On arrival at the start of the Green Mile the AAPTI permitted those who wanted to run faster to continue at their own pace to the end of the track. They were directed to reform as a group and wait until all were present before crossing Heath Road prior to returning to camp and completing the session. - All but the AAPTI, a LCpl, two Sprs (including Spr Morrison) took this option. They continued at their own pace with the AAPTI and LCpl.	- Witnesses reported that the runners were encouraged to continue at best-effort. It is likely that Spr Morrison continued to work hard and remained under physical stress. - The LCpl continued to provide encouragement. - Towards the end of the Green Mile, Spr Morrison appeared unstable and was seen weaving from side-to-side. - At this point the LCpl told Spr Morrison to stop. Spr Morrison then started to walk before he stumbled and fell.

			- Spr Morrison took a few paces supported by the AAPTI and LCpl who were then directed by the [redacted] nurse to stop and lay him down.

Table 1.4.3 - Run stages

1.4.137. During the run stages four to seven, the group split into slow and faster runners. With only the AAPTI present it may have been more appropriate to follow MOD guidance. Module 2 of DLE heat illness prevention training provided the following guidance: 'Always err on the side of caution and use the highest category maintained for more than three minutes by any individual'. This would have required the AAPTI to restrict all runners to Spr Morrison's pace. This guidance was not applied, and it was the opinion of the panel that this may have reduced the AAPTI's ability to engage with Spr Morrison effectively, apply measures corresponding to Spr Morrison's RPE and dynamically risk assess. The panel concluded that it made the outcome on 21 July 2022 more likely and was, therefore, a **contributory factor**. Exhibit 15 Exhibit 124

1.4.138. **Recommendation**. Director personnel (Army) should ensure that, during formal physical training, groups are not split unless there are sufficient suitably qualified personnel present to cover all elements of the group concurrently and to dynamically assess individual RPE.

Communications

1.4.139. No means of communications were carried during the PT session. Spr Morrison's condition on collapse required an emergency medical response which was initiated by a civilian [redacted] nurse who happened to be in close proximity. The [redacted] nurse dialled the emergency '999' number, requested an ambulance immediately and maintained a dialogue with the emergency call handler. Subsequently, further action was triggered when a LCpl and SNCO left the scene and proceeded to Woodbridge Medical Centre where they met the regiment's CMTs in the medical centre who responded immediately. Witness 5 Witness 12 Witness 17

1.4.140. As the incident developed, a further personal mobile phone was obtained from the [redacted] nurse's adult daughter also present at the scene. Obviously, this did not have the unit contact numbers within its memory, so contact with key unit personnel was less efficient than desired. A military duty mobile phone usually has key numbers stored. Witness 18

1.4.141. The regiment's risk assessment for the run directed that there must have been means of communication available to contact emergency services during the activity. AGAI volume 1 chapter 7 also directed that, during all forms of military training, the requirement for communications must be considered in the risk assessment and provision made where necessary.[93] The panel could find no evidence to show that any means of communication was carried by any personnel involved in the run. Exhibit 122 Exhibit 171

[93] AGAI volume 1 chapter 7, page 7-19, paragraph 7.057.

1.4.142. Had the [redacted] nurse not been present by chance, then there would have been a significant delay in triggering an emergency response. It would also have been difficult to co-ordinate any immediate response from the regiment. However, good fortune resulted in a rapid response from the regiment's CMTs due to their immediate availability in the Woodbridge Medical Centre, 1.6km from the incident. Furthermore, the East Anglia Ambulance Service arrived quickly. The target for a Category 1 incident of eight minutes was only just exceeded - commendable for a rural location. The panel concluded that in this event, the lack of communications did not have a material impact on the outcome for Spr Morrison but clearly could have done so on another occasion. The panel find the lack of communications was an **other factor**.

1.4.143. **Recommendation**. Deputy Chief of the General Staff should reinforce that either the activity OICs or PTIs carry a MOD provided mobile phone with emergency and unit contact numbers saved on the device in accordance with AGAI volume 1 chapter 7.

Section 3 - Treatment and response to the incident

1.4.144. **Symptoms**. The symptoms exhibited by Spr Morrison during the run were consistent with the onset of heatstroke. This was confirmed in the Discharge Summary Notification from [redacted] Hospital which recorded a main diagnosis of '[redacted]'. The hospital's main diagnosis was supported by the medical report which; after a review of the post-mortem, Spr Morrison's clinical notes from [redacted] Hospital and witness statements concluded that death was most likely due to exertional heatstroke. The differences between the post-mortem and the medical report are discussed in Section 4. Exhibit 10

1.4.145. **Joint Service direction**. JSP 950 leaflet 2-4-4 Exertional heat illness: Acute Treatment directed that a person suffering from heatstroke must have their body temperature decreased to below 38.5 °C within 30 minutes because their chance of recovery reduced the longer that treatment is delayed.[94] JSP 950 also described the 'chain of survival' as 'the successful management of heatstroke requires a number of actions to be undertaken in rapid succession resulting in a positive outcome for the patient'. The chain comprised of 'prevent, recognise, confirm diagnosis, effective cooling and monitor'. It was against this standard that actions taken to treat Spr Morrison have been evaluated by the panel to ensure that findings and recommendations were relevant to Defence. Exhibit 49

1.4.146. **Scope of analysis**. Analysis in the section concludes at Spr Morrison's arrival at [redacted] Hospital by ambulance when fully in the care of the NHS. The following factors have been considered:

a. Diagnosis.

b. Immediate action.

c. Cooling.

d. Treatment protocols differed between military and civilian clinicians.

[94] 'The goal of the first responder is to decrease the body temperature to below 38.5 degrees Celsius within 30 minutes. Morbidity and mortality are proportional to the time that a patient has been hyperthermic'. JSP 950 leaflet 2-4-4 Treatment of Heat Illness version 1.3 dated February 2022.

e. Professional recognition and co-operation.

f. Ambulance service clinical guidance.

g. Joint Royal Colleges Ambulance Liaison Committee clinical guidance.

h. Leading operations manager.

i. Confusion over incident location.

j. Preoccupation with wider communication.

k. Automated external defibrillator.

1.4.147. The panel found that there were contributory factors concerning diagnosis, immediate actions to treat heatstroke, effective collaboration between medical practitioners and NHS clinical guidance for the treatment of heatstroke.

1.4.148. **Diagnosis**. Once at the scene the [redacted] nurse dialled '999' at 08:54 and initiated a sustained dialogue with the emergency call handler. The [redacted] nurse and the SSgt suspected heatstroke shortly after collapse, however, this was not acted upon or considered in discussion with the emergency call handler. The SSgt deferred to the [redacted] nurses experience and took no further action concerning the diagnosis or treatment of Spr Morrison. Witness 5 Witness 16 Witness 17 Witness 22 Witness 24 Exhibit 9 Exhibit 49 Exhibit 52 Exhibit 68 Exhibit 195

1.4.149. Initially, a cardiac problem was suspected by the call handler which resulted in the leading operations manager (LOM) being despatched at 08:58.[95] The call handler also directed [redacted]. [redacted], the [redacted] nurse made it clear that Spr Morrison had an elevated heartbeat and was breathing unassisted and made the decision [redacted]. The [redacted] nurse also forcefully made the point that Spr Morrison was "[redacted]" and needed an ambulance to be moved to hospital immediately. The LOM was stood-down by the civilian call handler at 09:05 whilst on route to Woodbridge and the call handler disengaged when the paramedic arrived at 09:08.

1.4.150. On arrival, the paramedic did not recognise heatstroke and had momentarily considered sepsis as a possible cause but could not reconcile that condition with the symptoms. Understandably, the paramedic's assessment was heavily influenced by Spr Morrison's young age and the assumption that, as a soldier, he was fully fit. The paramedic found it difficult to reconcile these factors with the critical heatstroke casualty presented on 21 July 2022.

1.4.151. The LOM arrived at 09:25 and East of England Ambulance Service notes of the incident record a diagnosis of potential heatstroke at 09:31. The LOM had redeployed at the request of the paramedic and the diagnosis was over the 30-minute response time recommended for heatstroke within JSP 950.

1.4.152. It was the opinion of the panel that [redacted], as directed by the emergency call handler, was not required and distracted from heatstroke diagnosis and treatment. There were, however, sufficient indicators to support an immediate diagnosis of heatstroke, but this was not acted upon immediately. The symptoms had Exhibit 49 Exhibit 52 Exhibit 198

[95] The LOM responds to incidents for scene management and senior support.

become apparent during the latter stages of the run when participants had witnessed Spr Morrison's instability, he was seen weaving from side-to-side. In the opinion of the panel this late diagnosis of heatstroke may have significantly reduced Spr Morrison's chances of survival and was a **contributory factor**.

1.4.153. The panel **observed** that the symptoms presented by Spr Morrison at the point of collapse were effectively described within the Defence training materials. The diagnosis and immediate response to this were, therefore, considered to be within the capabilities of a trained soldier on completion of their annual mandatory training. Exhibit 196 Exhibit 198

1.4.154. **Recommendation.** Director of Defence Safety, with advice from Surgeon General, should refine the warning signs of heatstroke specified within JSP 375 chapter 41. Emphasis should be placed on understanding the effects of acquired ataxia, mental slowing or withdrawal, and rate of perceived exertion or heartrate (if suitable personal monitoring equipment is available) during non-maximal effort training. Policy should direct that evidence of heatstroke should result in the ceasing of activity and a review of participants initially by the activity OIC and all-arms PTI and subsequently by medical staff.

1.4.155. **Immediate action.** Without a diagnosis for heatstroke, at the time of Spr Morrison's collapse, immediate action to 'shade, strip, spray and fan' in order to initiate active cooling was not followed by either civilian or military personnel.[96] A passive attempt at cooling was made at approximately 09:15 with the removal of Spr Morrison's T-shirt by the paramedic concurrent with the application of ECG pads but active cooling was not initiated until 09:31. This was over 30 minutes after collapse when the LOM determined that Spr Morrison was suffering from heatstroke. Spr Morrison was covered in a water saturated sheet and moved into the air-conditioned ambulance. The cooling treatment was not as effective as it might have been and was not continued, the sheet being reported to be warm once in the ambulance. Witness 16 Witness 17 Witness 19 Witness 20 Witness 21 Witness 22 Witness 23 Witness 24 Exhibit 9 Exhibit 51 Exhibit 197 Exhibit 233

1.4.156. **Cooling**. The duration of hyperthermia is proportional to morbidity and mortality and so the quicker active cooling can occur, the greater the chance of survival. Active cooling occurs via evaporation and conduction. Evaporation is enhanced by convection and being wet enhances cooling via conduction. Hence the requirement for the shade, strip, spray, fan action to achieve active cooling. Covering with a wet sheet will enhance conduction only for a short time after which the sheet dries and conversely, then acts as an insulator. Furthermore, the placement of a casualty in a confined space like an ambulance will not permit convective airflow. The Air Ambulance Doctor confirmed on interview that when they arrived Spr Morrison 'felt hot'. The doctor assessed that Spr Morrison's collapse was likely to be related to heat and this diagnosis was reinforced by clinical test results whilst in the ambulance.

1.4.157. The panel found that the correct immediate action drill for heatstroke (as per JSP 950) was not completed. The time between Spr Morrison's collapse and active cooling being applied was outside the 30 minutes recommended. When active measures were finally applied it may have been too late to be effective. Medical tests completed in the ambulance clearly indicated the effects of heatstroke on the body and established that Spr Morrison was in a life-threatening condition. The panel found that the late application of JSP 950 conformant immediate action drills for heatstroke was a **contributory factor.** Exhibit 187 Exhibit 189

[96] Shade the casualty from the sun, strip, spray and fan them. JSP 950 leaflet 2-4-4 Treatment of Heat Illness version 1.3 dated February 2022.

1.4.158. **Recommendation.** The Surgeon General should ensure that Defence Medical Services treatment protocols for heatstroke become symptom-based rather than based on a diagnosis. There should be a protocol introduced across the DMS titled exertion associated collapse (that encompasses cardiac arrest, hypoglycaemia, seizure, heat illness and exertional collapse associated with sickle cell trait) rather than a diagnosis-based protocol on 'heat illness'. Exhibit 196

1.4.159. The panel **observed** that the CMT treatment protocols (released January 2023) did not have a protocol for exertion associated collapse or heatstroke. Exhibit 202

1.4.160. **Treatment protocols differed between military and civilian clinicians.** Three 23 Para Engr Regt CMTs arrived at 09:06, shortly before the East of England Ambulance Service paramedic and supporting technician at 09:09. On arrival, the CMTs strongly suspected heatstroke but deferred to the paramedic without following the heatstroke treatment guidance within JSP 950. Interviews with the CMT and paramedic exposed the differences in approaches to the incident: Witness 17 Witness 19 Witness 20 Witness 21 Witness 22 Exhibit 50 Exhibit 51 Exhibit 52 Exhibit 86 Exhibit 189 Exhibit 200 Exhibit 201

a. The CMTs wanted to take a rectal temperature as a step to confirm/dismiss heatstroke and confirmed that they had the capability to do so. However, this is not a method followed by the paramedic for reasons of protecting patients' 'modesty'. In accordance with NHS protocols, the paramedic opted to measure Spr Morrison's body temperature at the tympanic membrane (ear drum) and recorded a temperature of [redacted] at 09:11. This did not trigger treatment for heatstroke. JSP 950 states that 'oral and tympanic thermometers are unreliable for determining core temperature' but that 'rectal thermometers are less feasible in the field but should be used if possible'. In the event, the tympanic reading was sufficiently high to make consideration of its accuracy irrelevant.

b. In response to what CMTs perceived to be heatstroke [redacted]

c. The introduction of fluids intravenously would have aided rehydration but given Spr Morrison's condition on collapse, would have done little to contribute to active cooling. His was a situation in which rapid cooling should have taken priority over all other interventions within the first 30 minutes in accordance with JSP 950.

d. The paramedic did not reach a diagnosis and requested Helicopter Emergency Medical Services (HEMS) support at 09:20, 11 minutes after the

[97] Accounts of who suggested i[redacted] differed between the [redacted] nurse and CMTs. Both had the honest belief that they suggested this method of hydration to the ambulance crew. The panel were unable to confirm which account was the most accurate.

paramedic's arrival at 09:09. During the course of the initial treatment of Spr Morrison, there were opportunities for close clinical collaboration between those present but evidence suggests that this did not occur.

1.4.161. It was the opinion of the panel that closer clinical collaboration between the CMTs and paramedic could have resulted in a more coherent response and the application of more appropriate treatment protocols. This could have resulted in a quicker response to countering the effects of heatstroke and was a **contributory factor**.

1.4.162. **Recommendation**. The Surgeon General should ensure that the following is captured within military emergency medical procedures:

a. Clinical handover must occur when one practitioner hands over to another. There must be a clear understanding of responsibility within the new team of who is to lead.

b. If not already in existence, protocols should be introduced to ensure timely sharing of information and clinical understanding when multiple practitioners are involved in treatment.

1.4.163. **Recommendation**. Head Army Healthcare should ensure that battlefield casualty drill training is focused as much on immediate actions in exercise associated collapse, as it is on management of traumatic injury, in order to improve overall treatments in any scenario.

1.4.164. **Professional recognition and co-operation**. The panel encountered differing perspectives between the CMTs and the paramedic. The CMTs recognised the paramedic's clinical registration and hence their primacy in dealing with the casualty. However, whilst they continued to offer their advice during the incident, they were unable to influence decisions concerning treatment; the paramedic focussed on delivery of treatment in accordance with NHS protocols. Additionally, the paramedic had no recollection of any attempt to handover information concerning treatment. The paramedic remained unaware that the CMTs had clinical training and that they were able to contribute to an emergency medical situation. This is despite the CMTs deploying with a fully stocked emergency medical rucksack. Their emergency equipment was fully visible because it had been removed for use. Other factors may have influenced the paramedics perception:

Witness 19
Witness 20
Witness 21
Witness 22
Exhibit 68
Exhibit 203

a. The CMTs were not readily identifiable as clinically trained staff and it was understandable that the paramedic did not recognise their status due to the way they were dressed and badged. The CMTs were not wearing any form of identifier such as a red cross and consequently, their uniforms were no different to any other soldier.

b. It is possible that the paramedic was confused by the presence of the [redacted] nurse and [redacted] nurse who the paramedic assumed to be connected with the Army and Rock Barracks. This was understandable when considering the likelihood of two clinicians being present by sheer coincidence. By 09:08 there were seven medically trained personnel at the scene. The tempo and lack of co-ordination of the incident inhibited any structured engagement between them.

1.4.165. With no mutual understanding of who was present and their respective medical capabilities, opportunities for better collaboration were limited. It was the

opinion of the panel that this confused engagement between clinical practitioners, affected clinical decision making and was a **contributory factor**.

1.4.166. **Recommendation.** The Surgeon General should ensure that medically qualified military personnel in clinical roles wear an obvious symbol such as the red cross when on duty. It should be instantly recognisable and understood by all emergency services and first responders.

1.4.167. The panel **observed** that the incidence of heatstroke within the Army is likely to be proportionately far higher than in the general UK population. The Army holds a proportionately greater risk from illness or injury resulting from exertional activity, including heatstroke, given that this forms a routine part of their training. All army personnel are required to complete fitness tests according to their role and medical grading. The role fitness test included endurance elements and all soldiers have experienced suitably physically demanding preparation. Additionally, soldiers were deployed to challenging environments in which heatstroke was a persistent risk.

Exhibit 189
Exhibit 205
Exhibit 206
Exhibit 217

1.4.168. The civilian population does of course contain people who participate in sport, adventurous or endurance pursuits but this is concentrated in a relatively small proportion of the entire UK population. The opportunity for NHS responders to diagnose and treat heatstroke are, therefore, likely to be low, particularly in cases involving young people such as Spr Morrison. Military personnel, both clinical and non-clinical, are more likely to have encountered heatstroke or be attuned to it.

1.4.169. **Ambulance Service clinical guidance**. National ambulance service medical director's guidance for dealing with extreme heat emergencies was issued to the Ambulance Service on 18 July 2022.[98] It did not include advice on dealing with heatstroke, such as likely to be encountered in a youthful military population but focussed on the older civilian population and those people with underlying health conditions. It did not provide advice appropriate to dealing with heatstroke resulting from heavy physical activity. This was understandable when considering the population as a whole, rather than the unique military demographic. Spr Morrison clearly exhibited clinical signs of heatstroke that were not appropriately covered within NHS guidance.

Exhibit 205

1.4.170. **Joint Royal Colleges Ambulance Liaison Committee (JRCALC) clinical guidance**. JRCALC clinical guidance for the management of heatstroke placed greater emphasis on immediate transfer to hospital rather than active cooling at the incident site prior to movement. Understandably, the paramedic acted in accordance with JRCALC guidance in considering other clinical possibilities and hospital conveyance options. However, immediate and active cooling was a necessity in a case of Spr Morrison's severity. He had a core body temperature greater than [redacted] when he was handed over to the [redacted] Hospital Emergency Department approximately 1 hour 50 minutes after he had collapsed.

Witness 24
Exhibit 196
Exhibit 206
Exhibit 233

1.4.171. The panel found that the clinical guidance on heatstroke issued to ambulance personnel was insufficient. It did not give due consideration to exertional cases such as Spr Morrison's nor did it encourage more active cooling. The panel noted that this was a severe case that escalated rapidly. However, given that rapid

[98] NASMeD Clinical Guidance: Extreme Heat Emergency v 2.0 18 July 2022.

reduction in temperature was critical to recovery, the panel considered a lack of sufficient emphasis within NHS guidance to have been a **contributory factor**.

1.4.172. **Recommendation.** The Surgeon General should engage with JRCALC in order to establish a common understanding of how to treat heat illness and specifically heatstroke in a military context. This should lead to revised JRCALC clinical guidance for the management of exertional related heatstroke, including the need for active cooling before transfer to hospital.

1.4.173. **Leading operations manager**. On initial diagnosis of cardiac arrest, the LOM was despatched at 08:58 by the emergency call handler but was stood down at 09:05 once cardiac arrest was discounted in accordance with NHS procedure. However, the LOM remained concerned about the incident but could not override the call handler's decision so moved to Martlesham Ambulance Station to remain close if required. The LOM eventually deployed to the incident on the request of the paramedic at 09:13 and arrived at 09:25. On arrival the LOM assumed control and initiated active cooling to deal with heatstroke at 09:31.

Witness 22
Witness 24
Exhibit 9

1.4.174. NHS emergency procedures resulted in the later deployment of the LOM, depriving the paramedic of an extra level of support needed at the most critical time in Spr Morrison's treatment. However, given that this was standard practice for LOM deployment, the panel considered this to be an **other factor**.

1.4.175. The panel had no specific recommendation to follow the finding at para 1.4.174 above but considered it supportive of the recommendation at para 1.4.172 concerning a establishing a common understanding with JRCALC.

1.4.176. **Confusion over incident location**. The ambulance crew used the regiment's postcode as given by the soldiers at the scene but the incident occurred off Heath Road, immediately outside the barracks. This resulted in a slight delay to the ambulance's arrival. The call handler had noted that the ambulance would be met on its approach to the incident, but this did not happen. The ambulance turned towards the barrack's entrance in accordance with the given postcode. Prior to the ambulance's arrival, the lead runners in the group had been dispersed back to Rock Barracks but could have been utilised in meeting the ambulance and directing it to the incident.

Witness 11
Witness 12
Witness 22
Exhibit 52

1.4.177. The panel concluded that had personnel been deployed to meet the ambulance it could have been immediately directed to the incident. This delayed treatment for a few minutes and is, therefore, a <u>minor</u> but **contributory factor**.

1.4.178. **Recommendation**. Director of Defence Safety should consider standardising the communication of incident locations with the emergency services.

1.4.179. **Preoccupation with wider communication**. Soon after Spr Morrison's collapse the SNCOs became preoccupied with communicating the incident details to other personnel within the regiment and getting personal details for Spr Morrison. This included his next of kin. As a result, Spr Morrison's parents were informed of his condition outside of the recognised NOTICAS[99] process. The following ensued:

Witness 5
Witness 11
Witness 25
Witness 26
Exhibit 207
Exhibit 208
Exhibit 212-214

[99] Notification of a Casualty. JSP 751 Joint Casualty and Compassionate Policy and Procedures, version 23.2 dated June 2022.

a. The Sgt was away from the scene for approximately seven minutes, whilst the SSgt was away for approximately 26 minutes. This left the AAPTI (a junior soldier and only army person remaining) to assist with Spr Morrison's care for at least seven minutes.

b. Background information was requested by the [redacted] nurse driven by her desire to better understand the casualty. This triggered an immediate response from the Sgt as he attempted to acquire further details through the unit's clerical staff. This was an unnecessary distraction from any direct control or involvement with management of the incident.

c. Subsequently, the Sgt obtained their personal mobile phone. The Sgt then phoned the next of kin from the scene of the incident whilst medical treatment was in progress. If Spr Morrison had died at the scene, personnel would have had to inform Spr Morrison's parents, creating additional stress. The NOTICAS process informs the Joint Casualty and Compassionate Centre, which then informs the next of kin in a coordinated manner utilising a locally appointed notifying officer.

d. The regiment began the NOTICAS process between 10:30 and 11:00, after the next of kin had already been informed.

1.4.180. The panel **observed** that at least one of the SNCOs would have been better placed remaining at the scene. The runners previously dispersed could have potentially been used to obtain a defibrillator and communicate the issue to the regiment. This did not, however, impact the outcome on 21 July 2022.

1.4.181. It was the opinion of the panel that the [redacted] nurse's request for further information was as a result of her experience of working within a hospital environment rather than in a deployed emergency setting. Ultimately, this did not affect the outcome on 21 July 2022 and is, therefore, an **other factor**.

1.4.182. There is no recommendation to follow the finding at para 1.4.181 but it does reinforce the recommendation concerning establishing a common understanding of treatment at para 1.4.172.

1.4.183. The panel concluded that the next of kin should only have been informed through the NOTICAS process to avert the risk of unnecessary distress. However, this did not influence the outcome on 21 July 2022 and is considered to be an **other factor**.

1.4.184. **Recommendation**. Chief of Defence People should remind personnel that the casualty notification (NOTICAS) process is in place to ensure that next of kin are informed in a timely and controlled manner in accordance with defence protocols.

1.4.185. **Automated external defibrillator (AED)**. The search for an AED, as advised by the emergency call handler, was poorly coordinated. It led to the LCpl and Sgt separately tasking the guardroom to deliver the equipment. The guard force soldiers wrongly assumed that they had seen soldiers carrying a defibrillator to the incident. They did not verify the situation and consequently did not deliver an AED. The LCpl also looked for an AED at a local shop but was unsuccessful and then informed the CMTs in the medical centre that an AED was still required. If the CMTs had not been present, it is likely that the deployment of an AED to the scene would have been significantly delayed.

Witness 11
Witness 12
Witness 19
Witness 20
Witness 21
Witness 40
Exhibit 52

1.4.186. 23 Para Engr Regt have since ensured that AEDs are clearly displayed with one placed in a prominent position outside the main guardroom. Prior to and on the day of the incident, it had been kept inside the main guardroom. However, it is the opinion of the panel that an AED was unnecessary. Spr Morrison's condition was such that any cardiac event was highly likely to have resulted in an unshockable rhythm. In which case an AED would have been of no use. Witness 40

1.4.187. The panel **observed** that in Spr Morrison's case, an AED was not necessary because he was not in cardiac arrest but delivering one to the scene was an understandable precaution; albeit one that proved unnecessary and deflected attention away from making a diagnosis of heatstroke. Exhibit 60 Exhibit 195 Exhibit 203

Section 4 - Post-mortem examination

1.4.188. The post-mortem examination was completed on 4 August 2022 and concluded that Spr Morrison had cardiomegaly having determined that [redacted] thereby exceeding the recognised threshold for that condition. Exhibit 53

1.4.189. **Effect of cardiomegaly**. In the opinion of the consultant histopathologist '[redacted]' The histopathologist's finding did not align with expert military medical opinion. Exhibit 53 Exhibit 59-61 Exhibit 195

1.4.190. **Clarification of the post-mortem findings**. Director General Defence Safety Authority wrote to the [redacted] Coroner seeking clarification of the consultant histopathologist's findings. This was because of a clear difference of opinion between the histopathologist and military medical experts concerning the symptoms presented by Spr Morrison on 21 July 2022 and his cause of death. As a result, an amended post-mortem was issued dated 20 April 2023 in which the consultant histopathologist re-asserted his original findings and stated: Exhibit 59-61 Exhibit 195 Exhibit 225 Exhibit 227 Exhibit 228

'[redacted]

[redacted]

[redacted]'

1.4.191. **Military expert opinion**. On review of the case a military cardiologist stated that cardiomegaly is not a disease but a descriptive term. In the expert's opinion, the accident was more due to exertional heat illness than fatal cardiac arrhythmia. This was consistent with [redacted] Hospital's 'Discharge Summary Notification' which recorded a main diagnosis of '[redacted]'. Military medical expert opinion was evidenced by Spr Morrison's difficulty in sustaining the pace of the run, followed by ataxia and collapse. However, after collapse, he maintained his cardiovascular system, but with a loss of consciousness. These symptoms, the cardiologist determined, were predominantly neurological and Exhibit 10 Exhibit 195

consistent with the 'Discharge Summary Notification'. No examination of the central nervous system was completed during the post-mortem, so a conclusive finding was not possible.

1.4.192. **Reconciliation of the different clinical positions**. On 7 July 2023, the consultant histopathologist and a military consultant in emergency medicine met to discuss their findings and agreed the following: Exhibit 232

a. The post-mortem examination was predominantly a physical and histological process. The consultant histopathologist had only limited clinical notes to contextualise the clinical pathway pre-mortem. It was, therefore, a task for the wider investigation to correlate the post-mortem's findings with factors presented at collapse and during treatment on 21 July 2022.

b. The presence of cardiomegaly at post-mortem is beyond doubt. Given that multi-organ failure can emanate from problems with the heart, this is consistent with the [redacted] Hospital discharge notification's determination of the cause of death.

c. Accounts of the day did support a finding that heatstroke was a causative factor. However, during post-mortem, signs of heatstroke were non-specific and thus it would be challenging to state heatstroke as a cause of death. Heatstroke is predominantly a clinical diagnosis. There was, however, evidence of multi-organ failure at post-mortem which was also consistent with death from heatstroke.

d. Clinical notes pertaining to the collapse as well as eye-witness accounts did not suggest cardiac arrhythmia as a cause of the collapse. Despite the physical presence of cardiomegaly at post-mortem, analysis of both the post-mortem findings and the clinical notes were consistent with heatstroke as a likely cause of death.

e. It was accepted that neurological dysfunction (or primary neurological event) is a sign of heatstroke. However, there was no physical evidence to corroborate this at post-mortem (given normal computed tomography (CT) scan results in hospital). Additionally, the cranial vault was not routinely opened at post-mortem due to Covid-19 infection control measures.

f. Cardiomegaly could have been pathological or could have been acquired overtime. Neither could be determined. If acquired over time, then that might explain why Spr Morrison did not have difficulty with physical training in the past.

1.4.193. **Clinical conclusions**. The following was concluded during the meeting on 7 July 2023: Exhibit 232

a. It was reasonable to accept that a post-mortem might reach a different conclusion to a pure review of the clinical notes but ultimately, a finding was reached by correlating both reports along with the wider context. The post-mortem could not establish whether heatstroke occurred and was unlikely to reach that as a finding. However, given the circumstances described and symptoms presented at collapse, it was accepted that heatstroke could have been a causative factor.

b. Cardiomegaly was present and it had an effect which may have impaired the thermoregulatory response.

c. The differing findings could co-exist:

(1) Post-mortem cause of death: multi-organ failure due to cardiomegaly based on physical and histological findings at post-mortem.

(2) Add in the clinical context and correlation which led to a finding that collapse was caused by heat. This was primarily a neurological event and was made more likely by the underlying cardiomegaly.

d. The presence of cardiomegaly may also have explained the rapid and extreme onset of heatstroke on 21 July 2022.

1.4.194. It was the opinion of the panel that the symptoms presented by Spr Morrison during the run and at the point of collapse, were consistent with heatstroke. It has been established that Spr Morrison did not experience cardiac arrythmia and eyewitness statements concerning Spr Morrison's physical performance supported a diagnosis of heatstroke. **Therefore, it was the opinion of the panel that, on the balance of probability, Spr Morrison's cause of death was exertional heatstroke**. Witness 12 Witness 13 Witness 14 Witness 16 Exhibit 196 Exhibit 198

1.4.195. It was the opinion of the panel that cardiomegaly could have impaired Spr Morrison's thermoregulatory responses which made his collapse more likely and was, therefore, a **contributory** factor.

1.4.196. **Recommendation.** The Surgeon General should consider the feasibility of screening service personnel for cardiomegaly on entry to the armed forces. In so doing, the likely incidence, practicalities and prescribed national guidelines should be considered to determine whether screening can be effectively implemented.

Section 5 - General observations

1.4.197. **Programme SALAMANDER and linkage to Woodbridge**. Programme SALAMANDER aimed to provide defence with an individualised risk assessment and risk management solution for heat illness prevention. The programme included the development of physiological status monitoring technology to help with mitigating the risk of heat illness. This included the development of applications and wearable technology for commanders and individuals to plan, prepare and monitor for heat illness. Exhibit 209 Exhibit 111

1.4.198. During the run there was a clear need to monitor Spr Morrison's condition. It was the opinion of the panel that a range of capabilities potentially offered by Programme SALAMANDER could have provided Spr Morrison, the AAPTI and an OIC with vital information concerning Spr Morrison's condition. This is likely to have resulted in timely and more effective intervention and prevented collapse, which was an **other factor**.

1.4.199. **Recommendation**. Director of Defence Safety should ensure that defence carefully considers the widest possible utilisation of body worn monitoring equipment in order to optimise the risk management of routine physical activity.

1.4.200. **Application of lone soldier PT**. The lone soldier PT program was implemented in 2019 in accordance with Army Briefing Note115/19 to provide a 12- Exhibit 14 Exhibit 178

week structured PT programme for individuals to follow when they are separated from their unit for lengthy periods. The ABN stated … 'When applied correctly, the programme will support the CofC[100], ensuring soldiers maintain or increase their physical fitness and resilience, thereby reducing the risk of injury and increasing deployability.' Exhibit 180 Exhibit 210 Exhibit 211

1.4.201. 12 Para HQ & Sp Sqn Part One Orders for the 12, 14 and 19 July 2022 instructed personnel to conduct lone soldier PT at 08:00. The panel found that:

a. Lone soldier PT was applied incorrectly. It exposed soldiers to unnecessary risk during a heatwave when permitted to conduct physical training alone and not in accordance with a prescribed or supervised programme.

b. Witnesses stated that a run was completed as a group when lone soldier PT had been specified. It was applied inappropriately as a substitute for PT in hot weather conditions during the days preceding 21 July 2022. Witness 13 Witness 15 Witness 25

c. The term 'lone soldier PT' was ambiguous. Soldiers confuse it with doing their own PT rather than following the prescribed and structured programme to suit their specific level of fitness.

1.4.202. The panel found that the Regiment's interpretation of lone soldier PT did not have an impact on the outcome on 21 July 2022 but may be the cause of incidents in the future. It is, therefore, an **other factor**.

1.4.203. The panel noted at the time of writing the report, that the Army intended to launch its My Army Fitness Application, which the panel considered to be an improvement on the lone soldier PT programme. The application was designed to give all personnel the flexibility to train using the Army physical training system when away from their firm base and when they had no access to collective PT sessions. Exhibit 231

Recommendations from previous comparable service inquiries

1.4.204. **Previous related service inquiries.** In accordance with its terms of reference, the panel reviewed recommendations pertaining to previous service inquiries that also considered exertional heat illness as a factor. The aim being to identify wider issues and trends and to consider whether lessons identified have been actioned. This comparison [redacted] will enable the Defence Safety Authority to identify trends and determine further action as appropriate.

1.4.205. **Comparable inquiries**. Reports comparable to the Woodbridge service inquiry were:

a. Service Inquiry report into the deaths of 3 soldiers in the Brecon Beacons, Wales, in July 2013 [sic].

b. Service Inquiry into death of a Royal Marine during an endurance march on 28 May 15 on Dartmoor Training Area [sic].

[100] Chain of Command.

c. Service Inquiry into the death of 30210868 Rifleman MJ Evans, 5 Rifles on 18 June 2015 in Paderborn, Germany [sic].

d. Death of a Soldier during an Annual Fitness Test at Infantry Battle School, Brecon, 19 Jul 16 [sic].

1.4.206. **Common factors.** In each service inquiry the circumstances differed significantly. It was, therefore, difficult to make a direct comparison but in general terms, factors common to the Woodbridge service inquiry were as follows:

a. The need for all personnel to have a clear understanding of the symptoms of heat illness and apply the correct medical response immediately.

b. Those in leadership roles understanding the rate of perceived exertion and its application.

c. The application of effective audit and assurance within physical development to cover instructor management and wet bulb globe temperature equipment usage and maintenance.

d. Improvements in working with the NHS first responders at the scene of an incident.

e. The understanding of an activity OIC's responsibilities.

Summary of findings

Category definitions. As follows:

1.4.207. **Causal factor(s)**. 'Causal factors' are those factors which, in isolation or in combination with other causal factors and contextual details, led directly to the incident or accident. Therefore, if a causal factor was removed from the accident sequence, the accident would not have occurred.

1.4.208. **Contributory factor(s)**. 'Contributory factors' are those factors which made the accident more likely to happen. That is, they did not directly cause the accident. Therefore, if a contributory factor was removed from the accident sequence, the accident may still have occurred.

1.4.209. **Aggravating factor(s)**. 'Aggravating factors' are those factors which made the final outcome of the accident worse. However, aggravating factors do not cause or contribute to the accident. That is, in the absence of the aggravating factor, the accident would still have occurred.

1.4.210. **Other factor(s)**. 'Other factors' are those factors which, whilst shown to have been present, played no part in the accident in question, but are noteworthy in that they could contribute to or cause a future accident. Typically, other factors would provide the basis for additional recommendations or observations.

1.4.211. **Observations**. Observations are points or issues identified during the investigation that are worthy of note to improve working practices, but which do not relate to the accident being investigated and which could not contribute to or cause future accidents.

Section 1 - Setting the conditions

1.4.212. The section lists the findings the panel believed to have set the conditions for Spr Morrison's collapse on 21 July 2022. In so doing it covers what actions influenced the outcome up to 8:00am when the nine soldiers met for PT at the gymnasium.

1.4.213. The panel concluded that Spr Morrison chose to attend his RFT despite being told not to by a medical general practitioner. It was the opinion of the panel that Spr Morrison chose not to impede his progression towards completion of the combat engineering course having already experienced delay due to injury. This was an **other factor.** 1.4.28

1.4.214. Administrative processes did not prevent a soldier completing a challenging physical test when directed not to do so by medical staff. It was the opinion of the panel that this may have been due to the pressure [redacted] was under (as cited within the Ofsted report), which recommended 'Review the numbers of well-being and medical staff and adjust these to cope with the increasing number of trainees with mental health concerns, illnesses and injuries'. The panel found that the ability to conduct a physical fitness test while under medical direction not to do so was an **other factor** 1.4.29

1.4.215. The panel assessed that despite there being over five months between Spr Morrison's RFT and entry into the Field Army, he maintained a good level of physical activity and the gap did not directly increase the likelihood of exertional related conditions. There was no specific evidence presented to the panel to suggest that Spr Morrison joined 23 Para Engr Regt on 18 July 2022 in poor physical condition despite the weight gain mentioned earlier in the report. The panel concluded that a potential degradation in physical condition between an RFT and arrival at 23 Para Engr Regt was **not a factor**. 1.4.35

1.4.216. Spr Morrison's arrival process was impacted by the Sapper Games and the absence of sqn management. Additionally, he did not know, or had not been briefed, on the requirement for a fitness assessment – therefore no fitness assessment took place. A lack of supervision and guidance resulted in an incomplete arrival process. Had Spr Morrison been fully informed, he would have then entered into a level 2 physical training programme and then progressed to level 3 under supervision. Had this been the case, Spr Morrison would not have attended sqn PT on 21 July 2022. The panel concluded that Spr Morrison attended a sqn PT session prior to a formal assessment, which was contrary to regimental safe working practices. This prevented the unit from gauging Spr Morrison's fitness level and made any subsequent fitness issue more likely during level 3 PT. This was, therefore, a **contributory factor.** 1.4.40

1.4.217. The Army's heat illness awareness training sought the same training outcomes as its prevention training but timelines for completion were different. Awareness training was to be completed within the first three months of the training year, whilst prevention training was to be completed prior to 1 April each year. This and other inquiries involved physical training incidents that occurred during the months of May, June and July. However, this did not have a direct impact on 21 July 2022 but was an **other factor**. 1.4.51

1.4.218. In the opinion of the panel, training objectives for the DLE hosted heat illness prevention modules and UFTO course were considered appropriate, but delivery 1.4.55

methods may benefit from review to ensure learning is optimised. Additionally, the volume of courses could be reviewed in order to better target the training audience, prioritise and make more efficient use of time. However, the panel concluded that delivery methods and volume of courses was an **other factor**.

1.4.219. The panel found that the requirement for completion of Defence's heat illness prevention training, the Army's individual training and the Army's heat illness awareness training had not been fully met by the run's participants. This may have reduced the likelihood of an effective response to heat illness and was therefore a **contributory factor**. 1.4.57

1.4.220. It was the opinion of the panel that had closer control been exercised over the group, as advised within JSP 375, a more accurate and timely assessment of RPE may have been made and this was, therefore, a **contributory factor**. 1.4.62

1.4.221. It was the opinion of the panel that the opt-out section within AGAI volume 1 chapter 7 provided valuable advice but that the key messaging was diluted within a large amount of text. Additionally, opt-out policy was not covered within JSP 375 chapter 41. This had no impact on the outcome on 21 July 2022 but was an **other factor**. 1.4.65

1.4.222. It was the panel's opinion that the unit's self-assessment was not critical enough of its own PD management. Furthermore, the full audit did not identify issues with the unit's PD documentation. More detailed scrutiny during the full audit may have improved the unit's implementation of policy and good practice relating to heat illness and AAPTI management. Audit could have discovered the need to improve PTI assessment and training. The panel concluded that the lack of unit and RPoC scrutiny of PD records was a **contributory factor**. 1.4.70

1.4.223. It was the panel's opinion that the SMI, HQ 16 Air Assault Brigade Combat Team, could have been better utilised in the assurance process by conducting annual advisory visits for assurance purposes. This would have ensured closer alignment with the OPCOM chain and complemented RPoC visits which were often likely to have been impacted by limited time and resource. The panel also believed that it was more appropriate for operationally related audit or assurance to be conducted by the OPCOM chain rather than a regional or administrative chain. This had no direct impact on the 21 July 2022 but was an **other factor**. 1.4.72

1.4.224. WBGT equipment location. The panel received advice from the INM concerning the correct placement of QT34 monitoring equipment. They reaffirmed the point made within Policy Statement 3 of JSP 375 chapter 41, that monitors should be sighted in a "representative location". The INM confirmed that there was no specific academic research commissioned by Defence to support this but stated that the guidance arose from the experience of a high incidence of heat illness on physical endurance or test events. These were often on training areas some distance from a barracks hence the guidance concerning siting and a representative location. The route used on 21 July 2022 was over 2.5km away from the Rock Barracks gymnasium at the furthest point. The gymnasium where the WBGT reading was taken was not therefore a representative point. However, for the reasons discussed, the panel found that the location of the WBGT equipment was an **other factor**. 1.4.84

1.4.225. Given the finding at paragraph 1.4.77 regarding temperature not being a factor, there was no causal link between QT34 maintenance and the outcome on 21 1.4.87b

July 2022. The panel concluded that poor maintenance of a QT34 could contribute to or cause a future incident to occur and was, therefore, an **other factor**.

1.4.226. An incorrect reading was taken 21 July 2022. Without a reading for 'WBGTo' the outdoor heat stress index could not have been considered and could not inform a risk assessment. Thus, the AAPTI could not have been certain of the appropriate risk mitigation. The panel found that, given the finding concerning temperature not being a factor, there was no link between the incorrect QT34 setting and the outcome on 21 July 2022. The panel consider, however, that incorrect monitor setting could contribute to, or cause, a future occurrence and, therefore, was an **other factor**. 1.4.90

1.4.227. Written instructions for setting and taking the correct readings from a QT34 instrument were poor with respect to informing an activity risk assessment. The clear exception to this was module 4 of the heat illness prevention training hosted on the DLE. This was well focused on the key functions, easy to read and apply. The panel found that, given the finding concerning temperature not being a factor, there was no link between the incorrect QT34 written instructions and guidance and the outcome on 21 July 2022. The panel consider, however, that unclear written instructions could contribute to or cause a future incident and is, therefore, an **other factor**. 1.4.95

1.4.228. With the exception of Spr Morrison, no participants exhibited the need for rehydration or expressed any concerns over personal hydration or cooling during the run. However, had water been available then rehydration, and/or cooling, might have been considered when Spr Morrison appeared to be struggling. It is not possible to determine what effect provision of water may have had on 21 July 2022, but it was the opinion of the panel that the absence of water during the run increased the likelihood of heat illness occurring and removed a fundamental method of initial treatment and was, therefore, a **contributory factor**. 1.4.100

1.4.229. In terms of conducting PT, the AAPTI was not effectively managed. The lack of a current logbook indicated that no progressive training or mentoring had taken place. A requirement for mentoring identified in May 2022 was not followed up and 12 Para HQ & Sp Sqn's leadership were not cognisant of the AAPTI's limitations on 21 July 2022. It was the opinion of the panel that, with no formal contact with the wider PTI community, the AAPTI would have felt less motivated to sustain or develop physical development skills. The panel concluded that a lack of supervision and professional development rendered the AAPTI less able to run the PT session and was, therefore, a **contributory factor**. 1.4.112

Section 2 - Conduct of the run

1.4.230. Having been unable to compile a lesson plan for the session, or refer to the existing plan, the AAPTI was unable to fully consider the key factors to suit the circumstances of 21 July 2022. In the opinion of the panel, had the AAPTI had the opportunity to do so, it may have triggered more thought about the composition of the group and, therefore, it would have been less likely that difficulties or complications could have arisen. The panel concluded that the lack of time and opportunity for the AAPTI to plan the lesson was a **contributory factor**. 1.4.117

1.4.231. **Heat checklist**. The panel was provided with evidence indicating that a commander's heat checklist was signed after the incident on the same day. This was retrospective and, therefore, could not have been considered within any planning activity. Had the heat checklist list been available and discussed between an OIC and 1.4.119

AAPTI before the activity commenced, then both would have been better equipped to conduct a dynamic risk assessment of Spr Morrison's condition and provide potentially early intervention. The panel concluded that the lack of a formal checklist linked to roles was a **contributory factor**.

1.4.232. Spr Morrison's RPE was assessed to be at an RPE of 7 to 9 - higher than what was expected from the run but consistent with the increased physical intensity at Sandy Hill. Intervention at this point may have reduced the likelihood of collapse. The panel considered that a high RPE and the lack of proactive intervention were both **contributory factors**. 1.4.126

1.4.233. In the opinion of the panel, it was also probable that Spr Morrison was anxious/apprehensive about serving in his new unit which may have increased his individual drive to continue at a high RPE rather than reduce effort. This could have exacerbated the situation. The panel concluded that Spr Morrison's individual drive to complete the activity was a **contributory factor**. 1.4.127

1.4.234. In the opinion of the panel, had either SNCO been nominated as an OIC and been fully conversant with the responsibilities as listed in JSP 375, they may have intervened to deal with the developing situation earlier and more assertively. It is also likely that both SNCOs would have taken a greater interest in Spr Morrison as a new arrival, been more conscious of the risks and discussed whether a PT induction had been completed. It was the opinion of the panel that the lack of appointment of an OIC, and the associated understanding of an OIC's responsibilities, made the outcome more likely and was, therefore, a **contributory factor**. 1.4.133

1.4.235. The panel **observed** that during the course of the inquiry, 23 Para Engr Regt's subsequent OIC checklist was found to be an example of good practice and has already been adopted within 16 Air Assault Brigade Combat Team. 1.4.134

1.4.236. During the run stages four to seven, the group split into slow and faster runners. With only the AAPTI present it may have been more appropriate to follow MOD guidance. Module 2 of DLE heat illness prevention training provided the following guidance: 'Always err on the side of caution and use the highest category maintained for more than three minutes by any individual'. This would have required the AAPTI to restrict all runners to Spr Morrison's pace. This guidance was not applied, and it was the opinion of the panel that this may have reduced the AAPTI's ability to engage with Spr Morrison effectively, apply measures corresponding to Spr Morrison's RPE and dynamically risk assess. The panel concluded that it made the outcome on 21 July 2022 more likely and was, therefore, a **contributory factor**. 1.4.137

1.4.237. Had the [redacted] nurse not been present by chance, then there would have been a significant delay in triggering an emergency response. It would also have been difficult to co-ordinate any immediate response from the regiment. However, good fortune resulted in a rapid response from the regiment's CMTs due to their immediate availability in the Woodbridge Medical Centre, 1.6km from the incident. Furthermore, the East Anglia Ambulance Service arrived quickly. The target for a Category 1 incident of eight minutes was only just exceeded - commendable for a rural location. The panel concluded that in this event, the lack of communications did not have a material impact on the outcome for Spr Morrison but clearly could have done so on another occasion. The panel find the lack of communications was an **other factor**. 1.4.142

Section 3 - Treatment and response to the incident

1.4.238. It was the opinion of the panel that application of [redacted], as directed by the emergency call handler, was not required and distracted from heatstroke diagnosis and treatment. There were, however, sufficient indicators to support an immediate diagnosis of heatstroke, but this was not acted upon immediately. The symptoms had become apparent during the latter stages of the run when participants had witnessed Spr Morrison's instability, he was seen weaving from side-to-side. In the opinion of the panel this late diagnosis of heatstroke may have significantly reduced Spr Morrison's chances of survival and was a **contributory factor**. 1.4.152

1.4.239. The panel **observed** that the symptoms presented by Spr Morrison at the point of collapse were effectively described within the Defence training materials. The diagnosis and immediate response to this were, therefore, considered to be within the capabilities of a trained soldier on completion of their annual mandatory training. 1.4.153

1.4.240. The panel found that the correct immediate action drill for heatstroke (as per JSP 950) was not completed. The time between Spr Morrison's collapse and active cooling being applied was outside the 30 minutes recommended. When active measures were finally applied it may have been too late to be effective. Medical tests completed in the ambulance clearly indicated the effects of heatstroke on the body and established that Spr Morrison was in a life-threatening condition. The panel found that the late application of JSP 950 conformant immediate action drills for heatstroke was a **contributory factor**. 1.4.157

1.4.241. The panel **observed** that the CMT treatment protocols (released January 2023) did not have a protocol for exertion associated collapse or heatstroke. 1.4.159

1.4.242. It was the opinion of the panel that closer clinical collaboration between the CMTs and paramedic could have resulted in a more coherent response and the application of more appropriate treatment protocols. This could have resulted in a quicker response to countering the effects of heatstroke and was a **contributory factor**. 1.4.161

1.4.243. With no mutual understanding of who was present and their respective medical capabilities, opportunities for better collaboration were limited. It was the opinion of the panel that this confused engagement between clinical practitioners, affected clinical decision making and was a **contributory factor**. 1.4.165

1.4.244. The panel **observed** that the incidence of heatstroke within the Army is likely to be proportionately far higher than in the general UK population. The Army holds a proportionately greater risk from illness or injury resulting from exertional activity, including heatstroke, given that this forms a routine part of their training. All army personnel are required to complete fitness tests according to their role and medical grading. The role fitness test included endurance elements and all soldiers have experienced suitably physically demanding preparation. Additionally, soldiers were deployed to challenging environments in which heatstroke was a persistent risk. 1.4.167

1.4.245. The panel found that the clinical guidance on heatstroke issued to ambulance personnel was insufficient. It did not give due consideration to exertional cases such as Spr Morrison's nor did it encourage more active cooling. The panel noted that this was a severe case that escalated rapidly. However, given that rapid 1.4.171

reduction in temperature was critical to recovery, the panel considered a lack of sufficient emphasis within NHS guidance to have been a **contributory factor**.

1.4.246. NHS emergency procedures resulted in the later deployment of the LOM, depriving the paramedic of an extra level of support needed at the most critical time in Spr Morrison's treatment. However, given that this was standard practice for LOM deployment, the panel considered this to be an **other factor**. 1.4.174

1.4.247. The panel concluded that had personnel been deployed to meet the ambulance it could have been immediately directed to the incident. This delayed treatment for a few minutes and is, therefore, a minor but **contributory factor**. 1.4.177

1.4.248. The panel **observed** that at least one of the SNCOs would have been better placed remaining at the scene. The runners previously dispersed could have potentially been used to obtain a defibrillator and communicate the issue to the regiment. This did not, however, impact the outcome on 21 July 2022. 1.4.180

1.4.249. It was the opinion of the panel that the [redacted] nurse's request for further information was as a result of her experience of working within a hospital environment rather than in a deployed emergency setting. Ultimately, this did not affect the outcome on 21 July 2022 and was, therefore, an **other factor**. 1.4.181

1.4.250. The panel concluded that the next of kin should only have been informed through the NOTICAS process to avert the risk of unnecessary distress. However, this did not influence the outcome on 21 July 2022 and is considered to be an **other factor**. 1.4.183

1.4.251. The panel **observed** that in Spr Morrison's case, an AED was not necessary because he was not in cardiac arrest but delivering one to the scene was an understandable precaution; albeit one that proved unnecessary and deflected attention away from making a diagnosis of heatstroke. 1.4.187

Section 4 - Post-mortem examination

1.4.252. It was the opinion of the panel that the symptoms presented by Spr Morrison during the run and at the point of collapse, were consistent with heatstroke. It has been established that Spr Morrison did not experience cardiac arrythmia and eyewitness statements concerning Spr Morrison's physical performance supported a diagnosis of heatstroke. **Therefore, it was the opinion of the panel that, on the balance of probability, Spr Morrison's cause of death was exertional heatstroke**. 1.4.194

1.4.253. It was the opinion of the panel that cardiomegaly could have impaired Spr Morrison's thermoregulatory responses which made his collapse more likely and was, therefore, a **contributory factor**. 1.4.195

Section 5 - General observations

1.4.254. During the run there was a clear need to monitor Spr Morrison's condition. It was the opinion of the panel that a range of capabilities potentially offered by Programme SALAMANDER could have provided Spr Morrison, the AAPTI and an OIC with vital information concerning Spr Morrison's condition. This is likely to have 1.4.198

resulted in timely and more effective intervention and prevented collapse, which was an **other factor**.

1.4.255. The panel found that the Regiment's interpretation of lone soldier PT did not have an impact on the outcome on 21 July 2022 but may be the cause of incidents in the future. It was, therefore, an **other factor**. 1.4.202

Intentionally blank

Part 1.5

Recommendations

Intentionally Blank

Part 1.5 – Recommendations

1.5.1. **Introduction.** This section lists the recommendations made in section 1.4 to this report. They are made in order to enhance Defence safety.

1.5.2. **Director of Defence Safety**

a. Director of Defence Safety should mandate annual completion of heat illness prevention training for all uniformed Defence personnel serving in the UK and Northern Europe before and not during the summer months. Personnel, whether uniformed or civilian, serving in hot environments should continue to undertake the additional acclimatisation programme in accordance with the relevant operational requirement.	1.4.53
b. The Director of Defence Safety should re-evaluate training course quantity and delivery methods to ensure that the effect of heat illness prevention training is optimised.	1.4.56
c. Director of Defence Safety should ensure that the ability to opt-out of physical training across defence is highlighted as an applicable control measure within JSP 375 chapter 41.	1.4.67
d. Director of Defence Safety should ensure that there is greater representation of routine physical training (such as long, slow distance runs) within the work/rest tables provided within JSP 375 chapter 41 annex C to assist in the risk assessment of a broader range of physical activity.	1.4.81
e. Director of Defence Safety should reinforce current direction concerning wet bulb globe temperature equipment location and readings. For physical endurance events or activities posing a risk of heat illness, wet bulb Globe temperature readings should be taken at the actual activity location (or key points) to be truly representative.	1.4.85
f. Director of Defence Safety should affirm the importance of Defence heat illness prevention training module 4 and its direct relevance to activity risk managers.	1.4.93
g. Director of Defence Safety and Deputy Assistant Chief of Staff, HQ Field Army, should collaboratively review the guidance covering WBGT equipment usage and maintenance to ensure that it is consistent, clear, and contains the information required by operators to inform their activity risk assessments.	1.4.96
h. Director of Defence Safety, with advice from Surgeon General, should refine the warning signs of heatstroke specified within JSP 375 chapter 41. Emphasis should be placed on understanding the effects of acquired ataxia, mental slowing or withdrawal, and rate of perceived exertion or heartrate (if suitable personal monitoring equipment is available) during non-maximal effort training. Policy should direct that evidence of heatstroke should result in the ceasing of activity and a review of participants initially by the activity officer-in-charge and all-arms physical training instructor and subsequently by medical staff.	1.4.154

i. Director of Defence Safety should consider standardising the communication of incident locations with the emergency services. 1.4.178

j. Director of Defence Safety should ensure that defence carefully considers the widest possible utilisation of body worn monitoring equipment in order to optimise the risk management of routine physical activity. 1.4.199

1.5.3. **Surgeon General**

a. The Surgeon General should ensure that Defence Medical Services treatment protocols for heatstroke become symptom-based rather than based on a diagnosis. There should be a protocol introduced across the Defence Medical Services titled exertion associated collapse (that encompasses cardiac arrest, hypoglycaemia, seizure, heat illness and exertional collapse associated with sickle cell trait) rather than a diagnosis-based protocol on 'heat illness'. 1.4.158

b. The Surgeon General should ensure that the following is captured within military emergency medical procedures: 1.4.162

(1) Clinical handover must occur when one practitioner hands over to another. There must be a clear understanding of responsibility within the new team of who is to lead.

(2) If not already in existence, protocols should be introduced to ensure timely sharing of information and clinical understanding when multiple practitioners are involved in treatment.

c. The Surgeon General should ensure that medically qualified military personnel in clinical roles wear an obvious symbol such as the red cross when on duty. It should be instantly recognisable and understood by all emergency services and first responders. 1.4.166

d. The Surgeon General should engage with Joint Royal Colleges Ambulance Liaison Committee (JRCALC) in order to establish a common understanding of how to treat heat illness and specifically heatstroke in a military context. This should lead to revised JRCALC clinical guidance for the management of exertional related heatstroke, including the need for active cooling before transfer to hospital. 1.4.172

e. The Surgeon General should consider the feasibility of screening service personnel for cardiomegaly on entry to the armed forces. In so doing, the likely incidence, practicalities and prescribed national guidelines should be considered to determine whether screening can be effectively implemented. 1.4.196

1.5.4. **Commander Defence Primary Healthcare**

a. Commander Defence Primary Healthcare should conduct a review, in consultation with HQ Field Army, Director Land Warfare and 3 RSME, to determine (and adjust if required) whether the provision of service healthcare in the Minley area (and other phase 2 centres) is appropriate to the number and scope of Patients at Risk. 1.4.31

1.5.5. **Chief of Defence People**

a. Chief of Defence People should remind personnel that the casualty notification (NOTICAS) process is in place to ensure that next of kin are informed in a timely and controlled manner in accordance with defence protocols. 1.4.184

1.5.6. **Deputy Chief of the General Staff**

a. Deputy Chief of the General Staff should ensure that line managers supervise unit arrivals. They should notify them of the induction process in advance of arrival and pay particular attention to the completion of a Soldier Conditioning Review. This should include referring to the appropriate fitness assessment record for individual fitness results. 1.4.41

b. Deputy Chief of the General Staff should ensure that units have water immediately available during physical activity. The means by which this is to be carried should be dictated by the nature of the event, the lesson plan and risk assessment, and emphasised in policy. 1.4.101

c. Deputy Chief of the General Staff should remind the chain of command that all-arms Physical Training Instructors and activity officer-in-charges must have a clear understanding of rate of perceived exertion and the potential effect of participant's individual drive. To that end, Defence Learning Environment heat illness prevention training module 2 must be well understood by the Army's junior commanders. 1.4.129

d. Deputy Chief of the General Staff should strongly re-emphasise direction given in 2016 regarding the role of an activity officer-in-charge and take the opportunity to include appropriate instruction on leadership courses for officers and other ranks. This should be supported by a checklist (or similar) which details OIC responsibilities for a particular physical activity. 1.4.135

e. Deputy Chief of the General Staff should reinforce that either the activity officer-in-charges or physical training instructors carry a MOD provided mobile phone with emergency and unit contact numbers saved on the device in accordance with AGAI volume 1 chapter 7. 1.4.143

1.5.7. **Director Personnel (Army)**

a. Director Personnel (Army) should review whether physical training policy requires updating to reinforce the checks of personnel conducted prior to physical training/testing to reduce the likelihood of personnel with injuries attempting these activities. 1.4.32

b. Director Personnel (Army) should ensure that personnel do not participate in military physical training unless they are in-date for the mandated annual heat illness training. This is to be in accordance the Army's individual training requirement policy which demands that training be completed every 12 months. 1.4.58

c. Director Personnel (Army) should issue guidance to ensure that control measures within physical training risk assessments include: 1.4.63

(1) The appropriate rate of perceived exertion for the activity.

(2) A safe PTI to student ratio.

(3) Training should be conducted at the highest rate of perceived exertion maintained for more than three minutes by any individual in accordance with work/rest tables.

(4) Assessments should clearly state that personnel are not acclimatised within the UK and that the appropriate work/rest table should apply.

d. Director Personnel (Army) should assure, via the 2nd Line of Defence Assurance, that the correct wet bulb globe temperature equipment usage and currency of the PTI and wider user community is included in the ACSO 9018 question set and audit process. 1.4.91

e. Director Personnel (Army) should assure that only physical training instructors that are current and competent are allowed to lead physical training sessions. 1.4.113

f. Director Personnel (Army) should ensure that physical development lessons are not conducted unless the nominated PTI has had sufficient opportunity to prepare a lesson plan and that it has been reviewed by the activity OIC. 1.4.118

g. Director Personnel (Army) should ensure that physical development risk assessments, lesson plans and OIC checklists include checks to reduce the risk of heat injuries. Prior to the activity commencing, these documents should be reviewed by physical training instructors delivering each session and activity OICs responsible for ensuring that safe training is conducted. 1.4.120

h. Director Personnel (Army) should review and amend the policy direction and guidance on Rate of Perceived Exertion in AGAI volume 1 chapter 7 (to complement Defence Learning Environment Defence heat illness prevention training module 2 learning), so that practitioners, such as Physical Training Instructors and officer-in-charges, fully understand the application of rate of perceived exertion as a risk control measure. 1.4.128

i. Director personnel (Army) should ensure that, during formal physical training, groups are not split unless there are sufficient suitably qualified personnel present to cover all elements of the group concurrently and to dynamically assess individual rate of perceived exertion. 1.4.138

1.5.8. **Director Resources, Army Headquarters**

a. Director Resources as the Army's sponsor for ACSO 9001, army policy for audit and inspection, should reduce the reliance on unit self-assessment for physical development audits. The balance between self-assessment and formally constituted assurance visits should be reviewed to ensure key risk areas are fully addressed. 1.4.73

b. Director Resources as the Army's sponsor for ACSO 9001, army policy for audit and inspection, should consider greater involvement from the OPCOM chain in the assurance process to better align physical development with operational matters. 1.4.74

1.5.9. **Deputy Assistant Chief of Staff, HQ Field Army**

a. Director of Defence Safety and Deputy Assistant Chief of Staff, HQ Field Army, should collaboratively review the guidance covering WBGT equipment usage and maintenance to ensure that it is consistent, clear, and contains the information required by operators to inform their activity risk assessments. 1.4.96

1.5.10. **Assistant Head Safety (Army), Army Safety Group**

a. Assistant Head Safety (Army), Army Safety Group should ensure that the ability to opt-out of physical training is communicated as routine practise, including within generic risk assessments for physical development in accordance with AGAI volume 1 chapter 7. 1.4.66

1.5.11. **Head Army Healthcare**

a. Head Army Healthcare should ensure that battlefield casualty drill training is focused as much on immediate actions in exercise associated collapse, as it is on management of traumatic injury, in order to improve overall treatments in any scenario. 1.4.163

1.5.12. **Commander Field Army**

a. Deputy Assistant Chief of Staff Equipment, HQ Field Army, should ensure that QT34 maintenance procedures within Army are sufficiently rigorous to prevent the future use of damaged wet bulb globe temperature monitors. 1.4.88

b. Commander Field Army and Commander Home Command should write to their subordinate chain of command reminding them of their 1st Line of Defence Assurance roles, responsibilities, authority and accountability. This should include an emphasis on the currency of all military staff responsible for using and implementing wet bulb globe temperature equipment temperature readings as part of risk management.[101] 1.4.92

1.5.13. **Commander Home Command**

a. Commander Field Army and Commander Home Command should write to their subordinate chain of command reminding them of their 1st Line of Defence Assurance roles, responsibilities, authority and accountability. This should include an emphasis on the currency of all military staff responsible for using and implementing wet bulb globe temperature equipment readings as part of risk management. 1.4.92

---

[101] 1st Line of Defence Assurance 'is carried out by, or on behalf of, the operational management that own and manage risk – the way risks are managed and controlled day-to-day. Assurance at First Line differs from Second Line in that it comes directly from those responsible for delivering specific objectives or processes (e.g. Commanding Officer checks)'. (ACSO 4001, The policy for Army assurance, annex D, issued September 2022).

1.5.14. **Director Land Warfare**

a. Director Land Warfare should review and update Land Warfare Centre physical training policy (as required) to reduce the likelihood of personnel with injuries attempting physical training/testing, noting the additional personal pressures likely experienced by soldiers under training wishing to complete training without delays. | 1.4.33

b. Director Land Warfare should review holdover[102] (scale and policy in place to manage it) across the Land Warfare Centre's Operations Groups to ensure supervisory care, welfare and management of soldiers and staff is appropriate. | 1.4.34

[102] Holdover is used to describe soldiers waiting to begin a training course and/or undergoing rehabilitation for injury.

Part 1.6

Convening authority comments

Intentionally Blank

Part 1.6 – Convening authority comments

Introduction

1.6.1. This service inquiry (SI) was convened on 15 August 2022 to investigate the circumstances surrounding the tragic death of Sapper (Spr) Connor Morrison, 23 Parachute Engineer Regiment (23 Para Engr Regt). Spr Morrison collapsed during a routine physical training session involving eight other soldiers from the same subunit on 21 July 2022. After treatment at the point of collapse, Spr Morrison was moved by the East of England Ambulance Service to [redacted] Hospital where he subsequently died in intensive care on 23 July 2022.

1.6.2. The SI panel has submitted its report to me after 12 months of detailed evidence gathering, interviews and analysis. The panel's analysis covered the post-mortem and the medical symptoms presented by Spr Morrison prior to and during his collapse on 21 July 2022. Military medical expert opinion differed from the consultant histopathologist who established at the post-mortem that Spr Morrison had cardiomegaly, a heart condition that can impair thermoregulatory responses. The histopathologist's finding of "death by natural causes" did not align with expert military medical opinion.

1.6.3. After carefully considering the circumstances surrounding the activity and Spr Morrison's collapse on 21 July 2022, the panel concluded that the cause of death was more likely to be heatstroke and that cardiomegaly was a contributory factor. This was supported by a military expert's medical report which after a review of the post-mortem, Spr Morrison's clinical notes from [redacted] Hospital and witness statements, concluded that death was most likely due to exertional heatstroke. The findings and recommendations align to this conclusion.

1.6.4. The panel identified that there were numerous factors that contributed to Spr Morrison's collapse and subsequent death. These have been considered under four main subject areas:

a. Spr Morrison's pathway from basic training to 23 Para Engr Regt and the general circumstances in the regiment prior to 21 July 2022.

b. The conduct of the run.

c. Treatment and response to the incident.

d. The post-mortem and clinical discussion between the consultant histopathologist and military medical experts.

1.6.5. The panel has made 41 recommendations many of which related directly to the need to apply extant policy and guidance effectively. Having reviewed the report, I agree with the panel's findings and recommendations. If followed, they will greatly reduce the likelihood of any further heat illness related deaths in the services and potentially help improve the emergency service's response to military casualties. I urge all commands to review current practice at unit level and confirm that best practice is being applied. I offer the following observations.

Setting the conditions

1.6.6. The panel examined Spr Morrison's pathway from basic training in Army Training Centre (Pirbright) completed on 26 March 2021, through 3 Royal School of Military Engineering (3 RSME) for initial trade training, to the Defence School of Logistics and Administration (DSLA) for specialist trade training which Spr Morrison completed on 15 July 2022. Whilst physical training varied in intensity between 3 RSME and DSLA, the panel found no factors likely to have adversely affected his performance on arrival at 23 Para Engr Regt.

1.6.7. Spr Morrison arrived during a busy period for his regiment. His arrival process was impacted by the Sapper Games and the absence of squadron management. As a result, no arrival fitness assessment took place in accordance with regimental policy. Had this occurred then Spr Morrison may have entered a level 2 physical training programme and then progressed to level 3 under supervision. It is likely that Spr Morrison would not have attended squadron physical training on 21 July 2022.

1.6.8. The panel analysed the Regiment's training statistics and concluded that collectively, soldiers participating in the run had completed limited training in the identification and treatment of heatstroke. This may have impacted their ability to recognise signs and symptoms as Spr Morrison progressed towards collapse.

1.6.9. The Regiment's physical development (PD) audit records were reviewed. It was the panel's opinion that the unit's self-assessment was not critical enough of its own PD management and did not identify issues with the unit's management of all-arms PTIs (AAPTI). More detailed scrutiny during the full audit may have improved the unit's implementation of policy and good practice relating to heat illness and AAPTI management. This was the case with the AAPTI conducting the run. In terms of conducting physical training, the AAPTI was not effectively managed. The lack of a current logbook indicated that no progressive training or mentoring had taken place. A requirement for mentoring identified in May 2022 was not followed up and the subunit's leadership was not cognisant of the AAPTI's limitations prior to the run.

1.6.10. The day of the incident followed a period of intense heat in the UK. However, it should be noted that at 08:00 on 21 July 2022 the temperature sat below 20°C and remained so for the duration of the activity and ensuing incident. The run took place on Sutton Heath situated within 1km of Rock Barracks. It was used frequently for physical training and was familiar to regimental personnel. The terrain was mainly flat with some more challenging sections where the route crossed loose or broken sand. It was entirely reasonable to conduct a "steady-state" run that day and the conditions were not a factor in the outcome.

1.6.11. There was no deficiency in the content of orders and directives relating to heat in the UK cascading to 23 Para Engr Regt or in those relayed to the subunit. Communication, in various forms, sign-posted recipients to the appropriate guidance in advance of any period of exceptional heat. Regimental internal direction concerning the conduct of physical training for that week was ambiguous but, given the conditions on the day, was not a factor in the outcome.

Conduct of the run

1.6.12. With no prior notice of taking the physical training session, the AAPTI was unable to compile a lesson plan for the session. The AAPTI was unable to fully consider the key factors to suit the circumstances of 21 July 2022. Given the opportunity to do so, it may have triggered more thought about the composition of the group reducing the likelihood of difficulties or complications arising.

1.6.13. Spr Morrison's rate of perceived exertion (RPE) was assessed to be at 7 to 9 - higher than what was expected from the run but consistent with the increased physical intensity at Sandy Hill. A point early in the run where hill repetitions were completed on difficult going underfoot. It is possible that intervention at this point may have reduced the likelihood of collapse. In addition, it was probable that Spr Morrison was anxious or apprehensive about serving in his new unit which may have increased his individual drive to continue at a high RPE rather than reduce effort. This could have exacerbated the situation and underlines the need for timely and active intervention or dynamic risk assessment by those in charge.

1.6.14. Neither of the senior non-commissioned officers (SNCO) were aware of the role of an officer-in-charge (OIC). Had either SNCO been nominated as an OIC and been fully conversant

with those responsibilities then they may have intervened to deal with the developing situation earlier and more assertively. It is also likely that both SNCOs would have taken a greater interest in Spr Morrison as a new arrival, been more conscious of the risks and discussed whether a physical training induction had been completed.

1.6.15. During the latter stages of the run the group split into slow and faster runners. With only the AAPTI present it may have been more appropriate to follow MOD guidance and restrict all runners to Spr Morrison's pace. In the opinion of the panel, splitting the group may have reduced the AAPTI's ability to engage with Spr Morrison effectively, apply measures corresponding to Spr Morrison's RPE.

Treatment

1.6.16. On collapse, the application of [redacted] was not required and distracted from heatstroke diagnosis and treatment. There were sufficient indicators to support an immediate diagnosis of heatstroke, but this was not acted upon immediately. The symptoms had become apparent during the latter stages of the run when participants had witnessed Spr Morrison's instability, he was seen weaving from side-to-side. The symptoms presented by Spr Morrison at the point of collapse were consistent with those described within the Defence training materials. The diagnosis and immediate response to this were, therefore, within the capabilities of a trained soldier on completion of their annual mandatory training.

1.6.17. The East of England Ambulance Service and the unit's Combat Medical Technicians (CMT) arrived at the scene in time to deliver effective treatment. However, with no mutual understanding of who was present and their respective medical capabilities, opportunities for better collaboration were limited. Additionally, the panel found that the clinical guidance on heatstroke issued to ambulance personnel was insufficient. It did not give due consideration to exertional cases such as Spr Morrison's nor did it encourage more active cooling. This was a very severe case that escalated rapidly and demanded a rapid reduction in temperature having determined that Spr Morrison's temperature was greater than 40°C.

1.6.18. I note that the correct immediate action drill for heatstroke was not completed. The time between Spr Morrison's collapse and active cooling being applied was outside the 30 minutes recommended in JSP 950. When active measures were finally applied it was probably too late to have been effective. It is likely that closer clinical collaboration between the CMTs and paramedic could have resulted in a more coherent response and the application of more effective treatment.

Post-mortem and the medical report

1.6.19. I accept that the differences between the post-mortem's finding and the medical report have been adequately explained by the panel. The post-mortem examination was predominantly a physical and histological process. The consultant histopathologist had only limited clinical notes to contextualise the clinical pathway pre-mortem. The wider investigation has effectively correlated the post-mortem's findings with factors presented at collapse and during treatment.

1.6.20. Accounts of the day did support a finding that heatstroke was a causative factor. However, during post-mortem, signs of heatstroke were non-specific and thus it would be challenging to state heatstroke as a cause of death. Heatstroke is predominantly a clinical diagnosis. There was, however, evidence of multi-organ failure at post-mortem which was also consistent with death from heatstroke.

Conclusion

1.6.21. Having read the report, I am content that this tragic event has been investigated, analysed, and reported thoroughly, accurately, and rigorously. Whilst exertional related incidents

will continue to happen given the challenging nature of military training, we have a responsibility to reduce all risks to a level that is as low as reasonably practicable whilst maintaining effective physical training. Policy and guidance exist to ensure that we do so and, had effective measures been applied immediately, Spr Morrison may have survived. I strongly urge you to use this report to underline this point and emphasise that we are all capable of dealing with exertional heat illness.

1.6.22. On behalf of the Defence Safety Authority, I offer my sincere condolences to Sapper Connor Morrison's family, friends and loved ones.

S J Shell CB OBE MA
Air Marshal
Director General Defence Safety Authority