

OPINION UNDER SECTION 74A

Patent	GB2581484
Proprietor(s)	HESCO BASTION LTD
Exclusive Licensee	
Requester	DIRICKX SYSTEMS LIMITED
Observer(s)	
Date Opinion issued	18 August 2026

The Request

1. The comptroller has been requested to issue an opinion as to whether GB2581484 [hereafter the Patent] is valid in view of the following documents:

User Guide for the 'Ground Mounted Sangar Lite (GMSL)' from Harsco Infrastructure, V1a, February 2014. [hereafter HARSCO]

WO 2008/139211 [hereafter PD1]

WO 2010/052484 [hereafter PD2]

2. The Request acknowledges that PD1 and PD2 were both considered pre-grant. Within the Request these documents are only discussed in conjunction with HARSCO. Therefore, whilst the documents are not new the arguments presented are different from those considered pre-grant and it is not necessary to disregard PD1 or PD2.
3. The Patent was filed on 15th February 2019, with no priority claim, and granted on 24th November 2021. The Patent's current status is 'Granted'.
4. No Observations on the Request were received.
5. The Request was filed on 18th May 2026 and subsequent to this on 25th June 2026 a request for amendment of the Patent under Section 27 of the Patents Act 1977 was filed. This Opinion considers the claims as they stood on the date of the Request and does not take into account any requested amendments.

The Patent

6. The Patent relates to bomb and/or ballistic proof shelters which can be erected from transportable parts by a limited number of personnel in locations without infrastructure. The claims within the Patent are primarily focussed on a roof for such shelters.
7. The base part of the roof structure can be seen in Fig. 1a and is formed from primary beams (4) and secondary beams (5) which are covered by a roof member (6) (possibly formed from multiple panels (6a)) to provide a substantially planar surface. The roof structure can rest upon walls (2,3,7), which can be formed from filled gabions. Adjustable props may be embedded within the gabions to provide additional support for the roof.

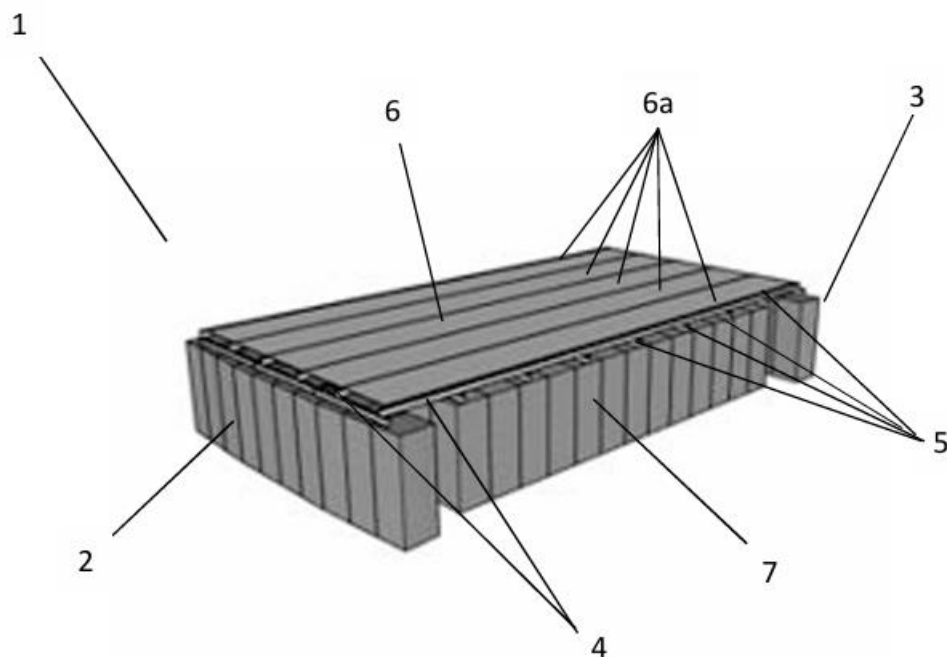
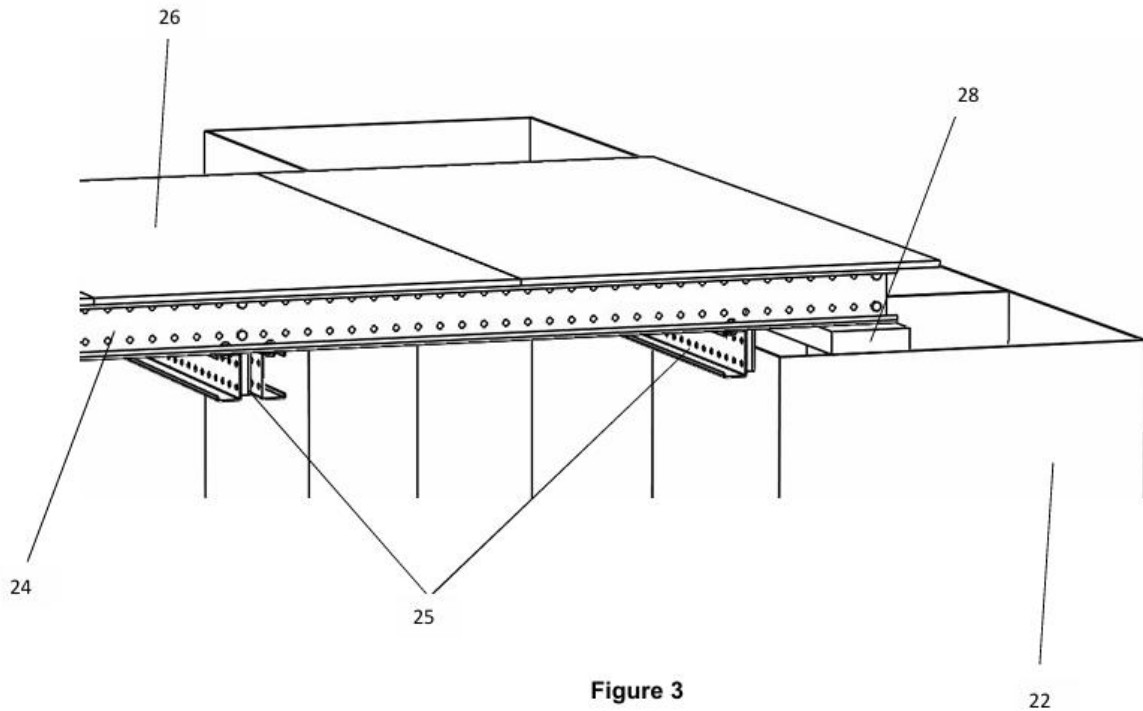


Figure 1a

8. The primary (24) and secondary (25) beams and roof member (26) can be seen in more detail in Fig. 3.



9. As can be seen in Fig. 1c, a containment means (8) is placed on the roof member, preferably around the perimeter. The containment means may be formed from gabions placed to form a wall around the perimeter of the roof member and the gabions and the space within the containment means (9) may be filled with material to provide the bomb/ballistic protection.

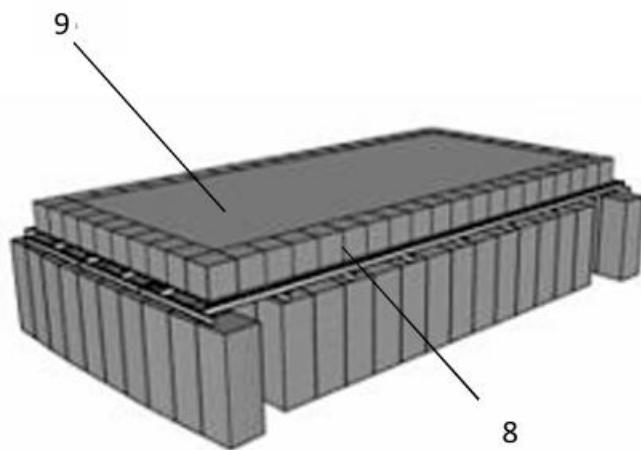


Figure 1c

10. The Patent has one fully independent claim 1 to a roof structure but dependent claims 14, 18 and 19 move the scope into new categories (shelters, kits and methods respectively).

1. A roof structure comprising:
 - at least two primary beams;
 - at least two secondary beams, wherein the secondary beams extend across the primary beams and wherein at least one secondary beam is attached to at least one primary beam;
 - a roof member, wherein the roof member is placed over and rests on the primary or secondary beams to create a substantially planar continuous surface that extends over at least the majority of the area created by the primary and secondary beams; and
 - a containment means provided on the roof member for containing a roof fill material supported thereon,
 - wherein the containment means are releasable from the substantially planar roof member.
14. A shelter comprising a first and a second outer wall and a roof structure according to any preceding claim, wherein one end of each of the primary beams rests on the first outer wall and the other end of each of the primary beams rests on the second outer wall.
18. A kit for building the roof structure of any one of Claims 1 to 13 comprising:
 - at least two primary beams;
 - at least two secondary beams;
 - a roof member, wherein the roof member is operable to be placed over the primary and secondary beams to create a substantially planar continuous surface that extends over at least the majority of the area created by the primary and secondary beams; and
 - a containment means, wherein the containment means is operable to contain a roof fill material supported on the roof member, and is releasable from the substantially planar roof member.

19. A method of building the roof structure of Claim 1 comprising the steps of:
- arranging the at least two primary beams;
 - arranging the at least two secondary beams to extend over the primary beams;
 - connecting at least one of the secondary beams to at least one primary beam;
 - placing the roof member over the primary and secondary beams, such that it rests on the primary or the secondary beams to form a substantially planar, continuous surface that extends over at least the majority of the area created by the primary and secondary beams; and
 - placing the containment means on the roof member.

Claim Construction

11. As a first step in determining the validity of the patent I must correctly construe the claims. This means interpreting them in the light of the description and drawings as instructed by Section 125(1).

For the purposes of this Act an invention for a patent for which an application has been made or for which a patent has been granted shall, unless the context otherwise requires, be taken to be that specified in a claim of the specification of the application or patent, as the case may be, as interpreted by the description and any drawings contained in that specification, and the extent of the protection conferred by a patent or application for a patent shall be determined accordingly.

12. In doing so I must interpret the claims in context through the eyes of the person skilled in the art. Ultimately the question is what the person skilled in the art would have understood the patentee to be using the language of the claims to mean. This approach has been confirmed in the decisions of the High Court in *Mylan v Yeda*¹ and the Court of Appeal in *Actavis v ICOS*².

13. The Protocol on the Interpretation of Article 69 of the EPC (which corresponds to section 125(1)) elaborates on the approach to be adopted. It states that:

Article 69 should not be interpreted in the sense that the extent of the protection conferred by a European patent is to be understood as that defined by the strict, literal meaning of the wording used in the claims, the description and drawings being employed only for the purpose of resolving an ambiguity found in the claims. Neither should it be interpreted in the sense that the claims serve only as a guideline and that the actual protection conferred may extend to what, from a consideration of the description and

¹ *Generics UK Ltd (t/a Mylan) v Yeda Research and Dev. Co. Ltd & Anor* [2017] EWHC 2629 (Pat)

² *Actavis Group & Ors v ICOS Corp & Eli Lilly & Co.* [2017] EWCA Civ 1671

drawings by a person skilled in the art, the patentee has contemplated. On the contrary, it is to be interpreted as defining a position between these extremes which combines a fair protection for the patentee with a reasonable degree of certainty for third parties.

14. The Request does not discuss claim construction or set out a view on the person skilled in the art (hereafter skilled person). For completeness, I think that the skilled person would be a designer of bomb/ballistic proof shelters or sub-structures thereof. It is less easy to estimate the extent of their common general knowledge but basic mechanical elements such as beams, sheets and so forth and ways of combining them would be included, as would means of making these structures proof against bombs/ballistics.
15. I think that the claims in the application are largely clear and can be straightforwardly understood, however a few of the terms used warrant further comment.
16. Claim 1 specifies primary and secondary beams. Whilst in the embodiments the primary and secondary beams are clearly distinguished, I think that in the context of claim 1 at least the primary/secondary terms are arbitrary and do not imply any technical difference between the beams. Some dependent claims (e.g. claims 5, 14) specify features which distinguish between the beam types but these distinctions do not apply beyond those claims.
17. In claim 1 the containment means are 'releasable' from the roof member. Releasable would normally imply that something must have been secured in order for it to be released. However, it is noted on page 6 of the application "The containment means may not be attached to the substantially planar roof member and may simply rest thereon". Hence, claim 1 will be construed without a requirement to secure the containment means to the roof member.
18. The 'kit' of claim 18 is not explicitly defined in the disclosure. It must clearly amount to the parts listed in the claim which are suitable for building into the roof structure of claim 1 being brought together, but I do not think that anything more is required for the set of parts to amount to a kit.

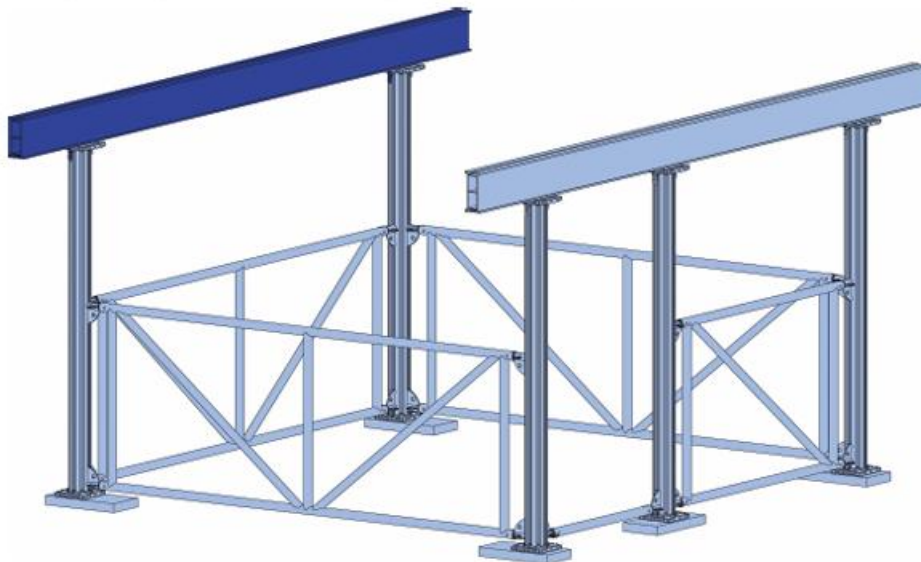
The Prior Art

19. HARSCO is a user guide which provides step by step instructions on how to construct the company's Ground Mounted Sangar Lite (GMSL) structure.
20. The Introduction on page 1 indicates that the GMSL can be deconstructed by reversing the assembly steps.
21. The early steps of assembly relate to the frame which support the roof structure and the first steps of interest are 10 and 11 where the first heavy duty roof beams are put in place.

10. Position one 4.2m heavy duty beam (serial 7) centrally across the head plates of the three 2m legs (serial 1) at the front of the GMSL, i.e. above the entrance. The beams should be connected using two ring bolt clamps (serial 9) at the head of each leg. The beam should be positioned so that the overhang is equal each side of the GMSL.

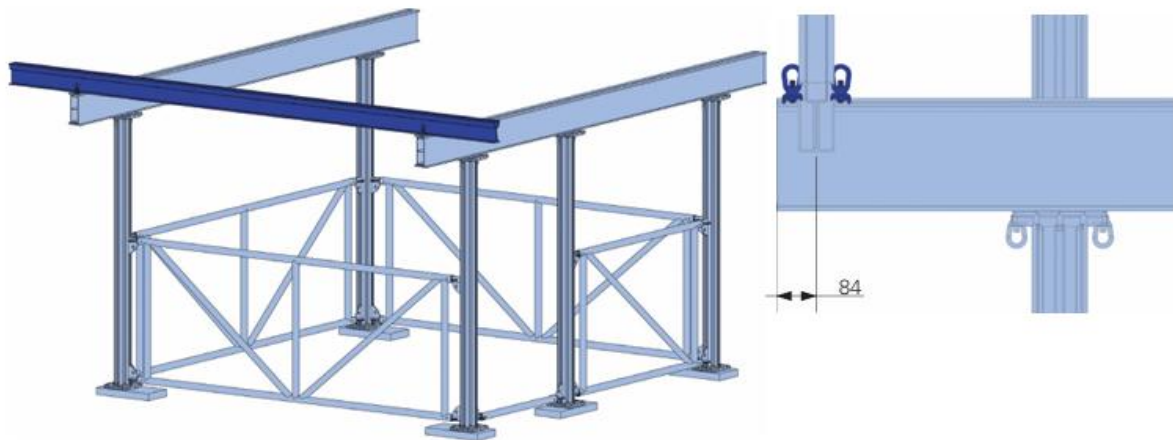


11. Repeat this action with the remaining 4.2m heavy duty beam (serial 7) across the head plates of the remaining two legs and connect using ring bolt clamps (serial 9).



22. Then at steps 13 and 14 further light duty beams are installed across the first beams.

13. Place one light duty beam (serial 8) 84mm from the end of the heavy duty beams (serial 7), ensuring equal overhang at each end. Secure the light duty beam (serial 8) to the heavy duty beams (serial 7) using two anchor clamps (serial 10). Clamps to be positioned as shown.

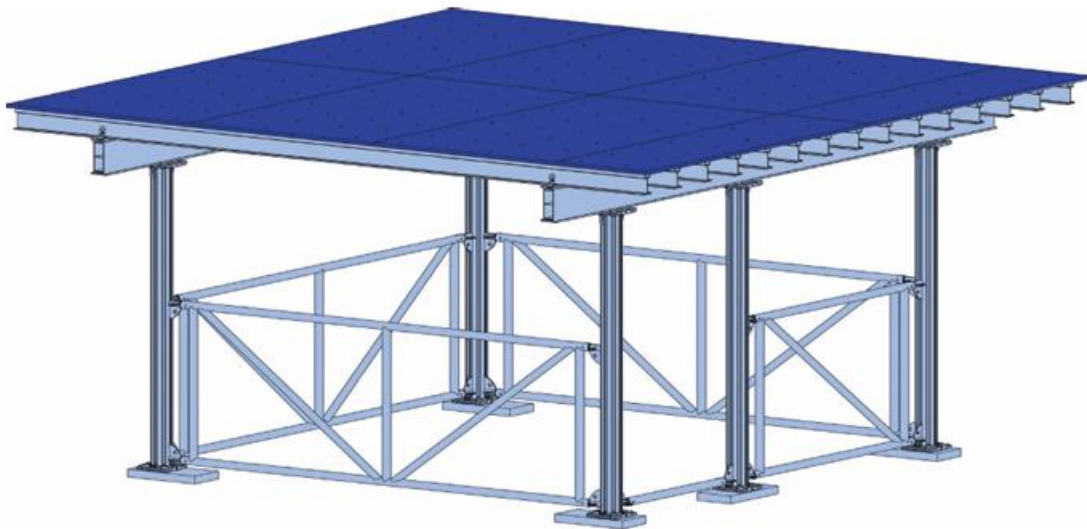


14. Continue to position and secure light duty beams (serial 8), working towards the other end of the heavy duty beam (serial 7). Position the light duty beams at 288mm centres.



23. This is immediately followed by step 15 where plywood sheets are laid over the light duty beams to form a planar surface across the whole area created by the beams.

15. Secure plywood sheets (serial 11) using nails (serial 12) at approx. 300mm centres. Note: If plywood (serial 11) is not cut to size; see Annexe A for dimensions and position sheets as shown.



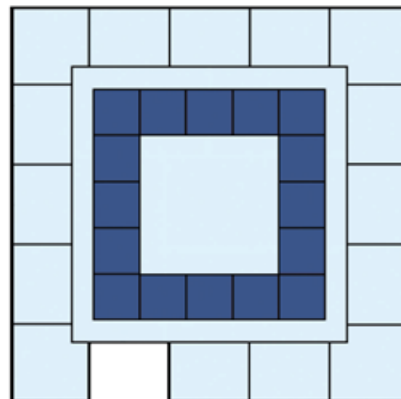
24. Skipping ahead to step 25, protection is installed around the frame and on to the roof structure.

Installation of protection

1. Install perimeter protection adjacent to legs (serial 1) and ledger frames (serial 4 and 5) ensuring that the structure is horizontally restrained in all directions.
2. Install roof protection ensuring the load does not exceed 10kN/m².

Please note: Hesco components are not supplied by Harsco Infrastructure. The relevant Hesco literature is also to be followed for correct installation guidance.

25. Position 16 No. full size Hesco Mil 5 units around the perimeter of the roof as shown. Ensure joints between individual cells are connected using the jointing pins. Jointing pins are to be fully inserted.



25. HARSCO does not specify what the 'Mil 5' units are, and the Request neglects to elaborate. Thus an internet search was necessitated. This revealed³ that currently Mil 5 units are a particular example of earth filled protective barrier, which concurs with step 27 where the Mil 5 units are filled. However, I will note that step 25 above specifies 16 Mil 5 units where each unit would correspond to a square in the

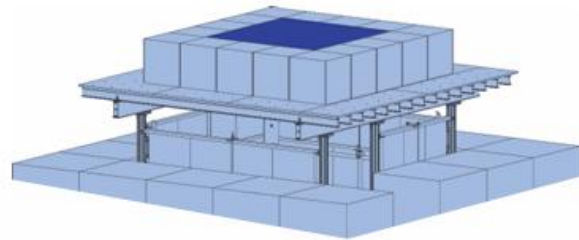
³ For example <https://www.hesco.com/products/military-barriers/mil> or <https://www.defensive-barrier.com/sale-12126106-hesco-mil-5-series-military-sand-wall-hesco-barriers-zinc-5-aluminum-alloy-wire.html>

associated figure, while the online examples indicate that a Mil 5 unit has 5 cells, corresponding to 5 squares. Thus, there seems to have been some change between 2014 and 2026. Despite this discrepancy it seems clear that the Mil 5 unit discussed in HARSCO is some form of earth filled barrier, even if the particular dimensions are not certain.

27. Hesco Mil 5 units to be filled with chosen fill. Layers are to be compacted every 0.3m.

26. Then at step 28 the void within the Mil 5 units is filled.

28. Central void is to be filled with granular material. Layers are to be compacted every 0.3m.



Validity

27. The arguments raised in the Request relate to the part of Section 1(1) of the Patents Act 1977 (hereafter the Act) which reads:

A patent may be granted only for an invention in respect of which the following conditions are satisfied, that is to say -

(a) the invention is new;

(b) it involves an inventive step;

(c) it is capable of industrial application;

(d) the grant of a patent for it is not excluded by subsections (2) and (3) or section 4A below;

and references in this Act to a patentable invention shall be construed accordingly.

28. Following the judgement in EPAI⁴ assessing Novelty and Inventive Step follows the First Hurdle, Intermediate Step, Second Hurdle approach.

29. The Request makes no mention of excluded matter the EPAI approach. Hence, I shall assume that the Request accepts that the claims in the Patent overcome the First Hurdle (any hardware) and that the Intermediate Step concludes that all the features of the claims contribute to their technical character.

30. I shall now proceed to the Second Hurdle and consider Novelty and Inventive Step of the claims in accordance with Section 2 and 3 of the Act respectively.

⁴ Emotional Perception AI Limited v Comptroller General of Patents, Designs and Trade Marks [2026] UKSC 3.

Novelty

31. Novelty is defined in Section 2 of the Act. Section 2(1) states

An invention shall be taken to be new if it does not form part of the state of the art.

32. and Section 2(2) of the states:

The state of the art in the case of an invention shall be taken to comprise all matter (whether a product, a process, information about either, or anything else) which has at any time before the priority date of that invention been made available to the public (whether in the United Kingdom or elsewhere) by written or oral description, by use or in any other way.

33. The Request makes assertions that various claims are anticipated by HARSCO without providing much supporting argument. I shall assess the asserted anticipations and, where appropriate, explain my reasoning to aid understanding of any opinion given.
34. The HARSCO document is dated February 2014, and there is nothing in the Request or the document which would suggest that this date is inaccurate. The Request asserts that HARSCO would have been available to any user of the GMSL system, which presumably implies an assertion that it was made available to the public. In the absence of Observations to contradict this I will accept that HARSCO was made available to the public in February 2014. This is prior to the earliest date of the Patent, 15th February 2019, and HARSCO is part of the state of the art in accordance with Section 2(2).
35. The Request asserts that this disclosure anticipates the roof structure of claim 1, the kit of claim 18 and the method of claim 19.
36. I think that the sections of HARSCO quoted above clearly disclose the elements of claims 1 and 19 and anticipate them. Roof structure (Fig. with step 28), primary beams (steps 10-11), secondary beams (steps 13-14), attachment/connection (step 13), roof member (step 15), containment means (steps 25, 28) and releasable (deconstruction instruction in the Introduction).
37. With respect to claim 18 the company Harsco only supply the beams and roof member and indicate that the containment means should be sourced elsewhere. Irrespective of the different sources, a person wishing to follow the steps in HARSCO would need to bring all of the required parts together and must implicitly create a kit. Hence, I think claim 18 would also be anticipated.
38. The Request also asserts that dependent claims 2-5 and 9-12 are anticipated by HARSCO.
39. I think that the passages of HARSCO quoted above clearly show parallel and perpendicular beam arrangements which anticipate claims 2 and 3.
40. The parts list in HARSCO includes 60 clamps for 15 light duty beams. I think that

taking this along with the connection method shown in HARSCO step 13 shows that all light duty beams are connected to all the heavy duty beams, anticipating claim 4.

41. As noted in Claim Construction above, the primary and secondary beams of claim 1 are not necessarily distinguished and do not necessarily correspond to either of the heavy and light duty beams in HARSCO. I think that it is allowable that the light duty beams of HARSCO be viewed as the primary beams of claim 1, in which case heavy duty (secondary) beams are attached to light duty (primary) beams on the opposite side to the roof member, and claim 5 is anticipated.
42. Conversely, when considering claim 9 I think it would be allowable to consider that the heavy duty beams of HARSCO corresponded to the primary beams of claim 1. The disclosure, on page 6, says that the anchor means which defines the distance between the primary beams **may** be a plate, **may** run along the top of the walls of the shelter, **may** provide load sharing and **may** prevent materials from entering the shelter but seems to leave the meaning of the term open ended. Thus, I think that it is fair to construe this term broadly, in which case the frame supporting the heavy duty beams in HARSCO amounts to anchor means defining the distance between the primary beams and I think that claim 9 is anticipated.
43. Claim 10 specifies that the containment means extends around the perimeter of the roof member. Perimeter is only mentioned in the discussion of Fig. 1b (the same as Fig. 1c reproduced above, but without the fill material) and one paragraph of the summary of invention [emphasis added].

*Figure 1b illustrates the shelter 1 of Figure 1a, in which containment means 8 have been positioned on the roof member 6. The containment means comprises a single row of filled gabions, which extends around the **perimeter** of the roof member 6.*

*The containment means may extend around the **perimeter** of the substantially planar roof member. The containment means may extend around the majority of the substantially planar roof member. This ensures that all or a majority of the roof fill material is contained on the roof member and that **the roof structure provides blast and/or ballistic protection over the entire area of the roof member.***

44. Given that the containment means must provide a fully encircling perimeter structure in order to contain roof fill material, the requirement to extend 'around the perimeter of the roof member' must go beyond this mere encirclement. Thus, placement of the containment means at or near the edge of the roof member would seem to be required by the wording of the claim when read in light of the passages above.
45. Considering the figures associated with steps 25 and 28 of HARSCO the containment means is placed somewhat distant and inward from the outer edges of the roof member. From the step 28 figure the containment means appear to extend slightly beyond the support pillars which define a 3.0m by 3.0m square. This would leave a lip of about 0.5m of roof member around the containment means, given the overall 4.2m by 4.2m size of the HARSCO roof. Hence, the containment means in HARSCO appears to provide protection to the area with the pillars, rather than the entire area of the roof member. Given this, I do not think that the containment means

can reasonably be considered to be at or near the edge of the roof member and thus it cannot be considered to extend around the perimeter of the roof member. Thus, I do not think that claim 10 is anticipated.

46. The Hesco Mil 5 unit referred to in HARSCO is a gabion and I think that claim 11 is anticipated by HARSCO.
47. Step 28 of HARSCO specifies placing fill material on the roof member within the containment means, thus I think that claim 12 is anticipated.

Inventive Step

48. Inventive Step is defined in Section 3 of the Act, which states

An invention shall be taken to involve an inventive step if it is not obvious to a person skilled in the art, having regard to any matter which forms part of the state of the art by virtue only of section 2(2) above (and disregarding section 2(3) above).

49. A structured approach to assessing Inventive Step was established in Pozzoli⁵ and I will follow it for this Opinion.

*(1)(a) Identify the notional “person skilled in the art”
(1)(b) Identify the relevant common general knowledge of that person;
(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;
(3) Identify what, if any, differences exist between the matter cited as forming part of the “state of the art” and the inventive concept of the claim or the claim as construed;
(4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?*

50. The Request asserts that claim 6-8, 13-17 and 20 lack an inventive step over HARSCO.
51. The Request asserts that the subject matter of these claims is ‘trivially known’, which I shall take as an assertion that this matter falls within the skilled person’s common general knowledge. It is here that the Request refers to patent documents PD1 and PD2 as examples of pre-detonation screens and relevant background.
52. Given my opinion above that claim 10 is not anticipated, for completeness I will consider whether it lacks an inventive step over HARSCO.
53. Steps 1 and 2 of the Pozzoli approach have been dealt with under Claim Construction above, so I shall move straight to steps 3 and 4.
54. Claim 6 specifies the use of two C shaped beams connected to create an I shaped beam (this works better in serif fonts) for at least one of the primary/secondary

⁵ Pozzoli SPA v BDMO SA [2007] EWCA Civ 588.

beams with claim 7 narrowing this by specifying spacers between the C beams. Claim 8 specifies all beams being C beam pairs and the spacers extending between both sets of beams to connect them.

55. The beams in HARSCO are single pieces with quite complex sections, quite different from the claimed C beams, which is acknowledged by the Request.
56. The Request asserts that C beams, spacers and interconnection using spacers are common general knowledge and thus an obvious alternative to the beams of HARSCO. Neither of PD1 or PD2 appear to use C beams and no other evidence is provided.
57. Despite this lack of evidence, the Request's assertion appears on the face of it to be plausible and in the absence of Observations or other argument, I am minded to accept it. Thus, I think that claims 6-8 lack an inventive step over HARSCO.
58. Claim 13 specifies a pre-detonation scheme formed from gabions.
59. The Request accepts that HARSCO does not disclose pre-detonation screens but asserts that they are common general knowledge and an obvious variation.
60. The documents PD1 and PD2 both refer to pre-detonation screens but here they are formed from plywood sheets rather than gabions, no other evidence is provided.
61. PD1 indicates that a pre-detonation screen should provide a surface sufficiently substantial to trigger detonation of an incoming munition at a distance (1m is suggested) from the layer of fill material on the roof to provide blast protection. It is plausible that an empty gabion placed on top of the fill material would provide such a surface at a suitable distance.
62. HARSCO makes no mention of pre-detonation screens. Subject to weight limits, adding a pre-detonation screen to HARSCO would appear to be straightforward and a pre-detonation screen would probably provide a protection benefit.
63. Despite the limited of supporting evidence, the Request's assertion that pre-detonation screens made from gabions are common general knowledge and that adding one to HARSCO would be obvious to the skilled person is plausible. In the absence of Observations or other contradicting argument, I am minded to accept the Request assertion on this point. Hence, I think that claim 13 lacks an inventive step over HARSCO.
64. Claim 14 specifies a shelter including the roof structure of claim 1 with its primary beam ends resting on opposing walls of the shelter. As acknowledged by the Request this differs from HARSCO, where the roof rests upon a dedicated frame and the 'walls' of the sangar do not reach roof height.
65. The Request asserts that the claimed shelters are common general knowledge and obvious in light of HARSCO. The documents PD1 and PD2 both disclose roof structures which rest upon opposing walls of the shelter they are built into, no other evidence is provided.
66. Since the Request does not explain the reasoning used in its inventive step

objections, I think I must take the basic approach and have the skilled person start from the sangar disclosed in HARSCO when considering inventive step.

67. The shelters shown in the embodiments of the Patent, as well as PD1 and PD2, which match up to the shelter specified in claim 14 have full height protective walls with substantially no external visibility.
68. The sangar of HARSCO has a dedicated roof support frame and 'half height' walls which seems to be a deliberate choice in order to provide all round visibility.
69. Thus, HARSCO discloses a structure with a purpose for which it is suited, that purpose being different from the purpose of the shelter of claim 14.
70. The skilled person considering HARSCO could adapt it into a different sort of structure. However, even where that other structure is commonly known, nothing in the evidence available or the very limited argument made suggests that the skilled person would adapt HARSCO in such a fashion.
71. Hence, I do not think that claim 14 is obvious light of HARSCO.
72. Since claims 15-17 depend upon claim 14 I also do not think that they are obvious in light of HARSCO.
73. Whilst claim 20 is not strictly dependent upon claim 14, I think that if the shelter of claim 14 with a roof resting on walls is not obvious, then it follows that a method of building such a shelter by resting a roof onto walls is not obvious. Hence, I do not think that claim 20 is obvious in light of HARSCO.
74. Finally, we come to claim 10. As discussed above, the containment means in HARSCO does not extend around the perimeter of the roof member.
75. Similarly to claim 14, since the Request asserted that claim 10 was anticipated and did not address inventive step, I think that I must adopt the basic approach of a skilled person starting from the sangar disclosed in HARSCO when considering inventive step.
76. As noted in the passage of the Patent quoted above the extent of the containment means defines the area which receives blast/ballistic protection. It seems reasonable that the skilled person's common general knowledge would include such basic information. From this the skilled person would understand that what is technically required is for the roof member and containment means to at least extend over the area to be protected, but that having the roof member and possibly the containment means extend beyond the area to be protected is not inherently problematic.
77. In the embodiment of the Patent the area within the walls (which arguably needs to be protected), the area of the roof member and the area protected by the containment means are all substantially identical.
78. In HARSCO the area surrounded by the frame, within which people/objects which would need protecting would be, and the area protected by the containment means are substantially identical. The roof member then extends further, beyond the protected area.

79. Starting with the sangar of HARSCO this has an area to be protected (within the frame) and a matching extent of protection/containment means which seems to be a deliberate choice. The skilled person looking at HARSCO could extend the protection out to the edge of the roof member, but none of the evidence available suggests to me that they would depart from the existing design choices in this manner. Additionally, issues like weight limits could well preclude such extension of the containment means putting practical obstacles in the path of the skilled person.
80. Alternatively, the skilled person looking at the sangar of HARSCO could modify it to have a greater protected area which matched the area of the roof member. In this case it would follow that the containment means would be extended to the perimeter of the roof member in order to cover the whole protected area. However, similarly to claim 14, nothing in the evidence available suggests that the skilled person would make this sort of substantial alteration to the HARSCO sangar.
81. Hence, I do not think that claim 10 is obvious in light of HARSCO.

Opinion

82. It is my opinion that claims 1-5, 9, 11, 12, 18 and 19 lack novelty over HARSCO and that claim 6-8 and 13 lack an inventive step over HARSCO and that the Patent GB2581484B is invalid.
83. It is my opinion that claims 10, 14-17 and 20 are novel and inventive over HARSCO.

Application for review

84. Under section 74B and rule 98, the proprietor may, within three months of the date of issue of this opinion, apply to the comptroller for a review of the opinion.

Owen Wheeler
Examiner

NOTE

This opinion is not based on the outcome of fully litigated proceedings. Rather, it is based on whatever material the persons requesting the opinion and filing observations have chosen to put before the Office.