Communities and Local Government

National Firefighter Selection Process Self Selection Questionnaire (SSQ)

Technical Manual

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Please note: This material has been developed specifically for use with the Self-Selection Questionnaire (SSQ). It is not to be used for any purpose other than that for which it was originally designed.

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Section One

Introduction

1.1 This document records the development of the Self-Selection Questionnaire (SSQ) and presents important technical information about this questionnaire.

1.2 The document is split into the following sections:

- proper use of the SSQ
- overview of the SSQ
- the development of the SSQ
- technical Information for the SSQ.

Section Two

Proper use of the Self-Selection Questionnaire (SSQ)

2.1 The Self-Selection Questionnaire (SSQ) has been designed as a pre-cursor to the National Firefighter Selection (NFS) process, to help individuals decide whether they are suitable for the role of Firefighter. It has not been designed to be part of, and should not be used by Fire and Rescue Services (FRSs) in a formal selection context.

2.2 This document outlines standards concerning the use and availability of the SSQ and is in line with those guidelines outlined by the British Psychological Society (BPS) and current opinion concerning best professional practice in the use and supply of assessment tools.

2.3 Cautionary Note – It is the responsibility of authorised administrators to ensure that appropriate measures are taken to safeguard the proper use of the Self-Selection Questionnaire (SSQ).

Section Three

Overview of the SSQ

3.1 Introduction

3.1.1 The purpose of this section is to provide a detailed description of the SSQ, the rationale behind its development and information on its administration. The SSQ itself should be examined to gain a full appreciation of its content.

3.2 Aim of the SSQ

3.2.1 The aim of the SSQ is to assist individuals in deciding whether they have the potential to be a successful Firefighter and therefore whether they should apply to be a Firefighter. The questionnaire provides different scenarios in order to:

- Give individuals an idea of what it means to be a Firefighter
- Describe what Firefighters are expected to do
- Give individuals a chance to see whether this matches what they thought would be involved in being a Firefighter
- Give individuals an idea of whether being a Firefighter is right for them.

3.2.2 In designing the SSQ a number of important issues were considered, including:

- The tool should assess all the National Firefighter PQAs.
- While it was important that the SSQ has a clear firefighting theme, the content of the SSQ has been designed so as not to disadvantage those without experience of the Firefighter role.
- As with all the assessment tools used as part of the NFS process, the SSQ needed to promote a positive and accurate image of the role of a Firefighter. As a consequence, the SSQ has been designed to ensure that it presents a realistic pre-view of the type of situations and demands that individuals might face as a potential Firefighter.

3.3 Composition of the SSQ

3.3.1 Individuals are presented with a series of scenario-based multiple-choice questions that require them to consider and select the option that best describes what they would do in each situation. The scenarios reflect the types of situations a Firefighter might be involved in.

3.3.2 The questionnaire consists of 42 questions grouped into nine small sections, each with four, five or six related questions. The nine sections cover the nine PQAs required to be an effective Firefighter: Working with Others, Effective Communication, Commitment to Diversity, Confidence and Resilience, Commitment to Excellence, Openness to Change, Commitment to Development, Situational Awareness and Problem Solving.

3.4 Administration of the SSQ

3.41 The SSQ has been designed to be self administered via the internet. Detailed instructions are provided within the assessment information.

3.5 Scoring and feedback

3.5.1 Scoring is done by computer. An answer key and feedback texts have been provided separately.

Section Four

The Development of the SSQ

4.1 Overview of the development process

4.1.1 The SSQ has undergone a rigorous four stage development procedure designed to ensure that the final psychometric assessment is as fair and effective as possible.

4.1.1 Figure 1 presents a general overview of the SSQ development process. More specific details concerning the development of each assessment follows:

Figure 1 – General Overview of the SSQ Development Process

Stage 1: Defining the Concept

- National Firefighter PQAs reviewed to identify those that would be assessed most effectively by the SSQ
- Specification for the SSQ developed

Stage 2: Scenario and Question Writing

- Ideas for trial questions and scenarios generated at Firefighter PQA workshops
- Initial sample of trial questions and scenarios written according to strict guidelines to ensure all questions meet the highest standards of psychometric quality and reflect those situations and challenges likely to be encountered by a Firefighter
- Initial sample of questions and scenarios reviewed by Business Psychologists and Equal Opportunity Experts

Stage 3: Phase I Piloting

- Trial version of the SSQ piloted with a large representative sample of mock candidates of differing gender and ethnic origin (i.e. trainee Firefighters, participants from public service courses, etc.)
- Analysis undertaken to identify the most fair, relevant and reliable questions for inclusion in the tests

Stage 4: Phase II Piloting

- Final version of the SSQ piloted with a representative sample of Firefighter candidates from FRSs across the UK.
- Analysis undertaken to confirm the effectiveness of the final questions and to develop standardised scoring keys for each test

4.2 Stage 1: Defining the concept

4.2.1 The starting point for the development of the SSQ, was the development of the National Firefighter Personal Qualitiles and Attributes (PQAs). Detailed information concerning the National Firefighter PQAs' development process can be found in 'Development of the National Firefighter Selection Tests: Psychological Report (2005)'

4.2.2 The PQAs were reviewed to identify those criteria that could be assessed most effectively by a self selection tool. This review identified that it was possible for each of the PQAs to be assessed by a self selection tool and confirmed the need to develop a bespoke questionnaire.

4.2.3 As a result of the review, the specification for a self-administered, scenario-based realistic job-preview questionnaire was developed.

4.2.4 The remainder of this section outlines more specific information concerning the procedures followed to develop the SSQ.

4.3 Stage 2: Scenario and question writing

4.3.1 Initial ideas for the scenario-based questions were generated at workshops involving FRS operational personnel, trainers and HR specialists. The purpose of using such personnel was to ensure that the scenarios were realistic and accurately reflected the demands of the Firefighter role.

4.3.2 Using this information a range of scenarios and questions were drafted for the SSQ. The aim at this stage was to develop far more scenarios and questions than were actually needed and to use the two phases of piloting to ensure that only the fairest and more effective questions were selected for the final questionnaire.

4.3.3 At this stage of the development process changes were made to the PQAs and the design specification in the light of the Bain Report and White Paper. Additional questions were written particularly to reflect the assessment of an additional PQA (i.e. Openness to Change) and other questions were amended.

4.3.4 The SSQ was then reviewed by external Equal Opportunity experts to ensure that the content was fair to all minority groups. The SSQ was also reviewed at a workshop consisting of individuals interested in becoming Firefighters. The individuals completed the SSQ and a trial version of a paper-based self scoring mechanism. The scoring mechanism allowed them to score their own responses and generate feedback on the SSQ. It was found that individuals who self scored and received negative feedback returned to the questionnaire and changed their responses until their received positive feedback. It was, therefore, recommended that the SSQ be computer scored.

4.3.5 As a result of this process the SSQ consisted of 70 scenario based questions grouped into PQA-specific sections. Each PQA section included between 6 and 12 questions.

4.4 Stage 3: Phase I Piloting

4.4.1 The 'trial' SSQ was piloted with mock applicants (e.g. trainee Firefighters, participants from public service courses, prospective applicants, etc). Statistics for the Phase I piloting sample can be found in Appendix A. The SSQ was administered during Phase I Piloting without a time limit, but candidates usually completed it in 70 to 80 minutes.

4.4.2 The data from the piloting was analysed to identify the most effective and fair questions for the 'draft' versions of the tests. The data from Phase I Piloting was subjected to classical psychometric item analysis and item response theory (IRT) analysis. Items were eliminated if they did not meet certain criteria, for example where the discrimination indices were two low (i.e. the correlations between the item scores and the interim test score), etc. The data was analysed in terms of gender and ethnic group differences, and items that showed significant bias were also eliminated. Those items deemed effective and fair, based on the above analysis were then carried forward to the 'draft' version of the questionnaire.

4.5 Stage 4: Phase II Piloting

4.5.1 The SSQ in its revised and reduced form was then piloted by FRSs with actual candidates going through Firefighter selection. Performance on the SSQ did not form any part of the selection decision made. Statistics for the Phase II piloting sample can be found in Appendix B.

4.5.2 Further item analysis was completed to confirm the structure and internal consistency of the tests and to provide relevant norm data.

4.5.3 Constraints on the time available to collect data and on the number of FRSs able to participate meant that it was not possible to collect sufficient data from black and minority ethnic and female candidates to allow for meaningful analysis looking specifically at these groups. As a result this analysis will need to be conducted during the early implementation of the NFS process.

Section Five

SSQ Technical Information

5.1 Section contents

5.1.1 This section contains the following technical information and data:

- Summary statistics – standardisation sample
- Norm table
- Internal reliability
- Adverse impact.

5.2 Summary statistics – standardisation sample

Sample size	Minimum score	Maximum score	Mean score (raw score)	Standard Deviation (raw score)
68	14	42	36.84	4.64

5.2.1 Please note that the mean scores and standard deviation differences reported below are provided as standard T scores.

Gender	Sample size	Mean score (T score)	Standard Deviation (T score)
Male	67	49.94	10.06
Female	1	54.66	–

Ethnic Origin	Sample size	Mean score (T score)	Standard Deviation (T score)
White	60	51.47	6.77
Black and Ethnic Minority	3	48.19	9.87

5.3 Total SSQ Score Norm tables

5.3.1 The norm table has been provided so that a candidate's total raw score scale can be converted into a standardised T score. A T score should be used when looking at test performance as it compares a candidate's score against a representative group of test takers and allows the meaningful interpretation of test performance.

Raw Score Total	T Score
1	-27.2
2	-25.1
3	-22.9
4	-20.8
5	-18.6
6	-16.5
7	-14.3
8	-12.2
9	-10.0
10	-7.8
11	-5.7
12	-3.5
13	-1.4
14	0.8
15	2.9
16	5.1
17	7.2
18	9.4
19	11.5
20	13.7
21	15.9
22	18.0
23	20.2
24	22.3
25	24.5
26	26.6
27	28.8
28	30.9
29	33.1

Raw Score Total	T Score
30	35.3
31	37.4
32	39.6
33	41.7
34	43.9
35	46.0
36	48.2
37	50.3
38	52.5
39	54.7
40	56.8
41	59.0
42	61.1

5.4 Internal reliability

5.4.1 The internal reliability of the SSQ was assessed by the calculation of Cronbach's alpha. The test's level of internal reliability is shown in the table below together with the standard error of measurement (SEM).

Sample size	Reliability	Sig. (2-tailed)	SEM (T scores)
68	0.83	P<0.05	4.15

5.4.2 An index of 0.7 and above is considered to indicate an acceptable level of consistency for an assessment tool like the SSQ. The results therefore confirm that the SSQ meets an acceptable level of internal reliability and provides important positive evidence of the test's reliability.

5.5 Adverse impact

5.5.1 The number of participants from minority groups was below the threshold required in order to conduct meaningful and reliable analysis. Therefore, levels of adverse impact and mean differences between the test performance of majority and minority groups were not examined.

5.5.2 As soon as sufficient minority data has been collected such analysis will be conducted.

5.6 Validity

5.6.1 Further information concerning the SSQ's validity will be presented once the data on 'live' Firefighter candidates become available.

Appendix A

Phase I Piloting Sample Statistics

A1 Demographics: Self Selection Questionnaire

Table 1: Self Selection Questionnaire/Brigade		
Brigade	**Number of Participants**	**%**
Avon/Somerset	46	12.5
City of Bristol	17	4.6
Devon/Cornwall/Jersey	43	11.7
Dorset	36	9.8
Gloucester	65	17.6
North Yorkshire	38	10.3
ODPM	4	1.1
South Yorkshire	19	5.1
West Midlands Fire & Rescue Service	26	7.0
West Yorkshire	52	14.1
Wiltshire	23	6.2
Total	**369**	

Table 2: Self Selection Questionnaire/Gender		
Gender	**Number of Participants**	**%**
Male	272	73.9
Female	96	26.1
Undeclared	1	
Total	**369**	

Table 3: Self Selection Questionnaire/Ethnic Origin		
Ethnic Origin	**Number of Participants**	**%**
White	325	93.7
Black and Minority Ethnic	22	6.3
Undeclared	22	
Total	**369**	

Table 4: Self Selection Questionnaire/Age		
Age	Number of Participants	%
16-20	135	36.6
21-25	101	27.4
26-30	66	17.9
31-35	45	12.2
36-40	13	3.5
41-45	5	1.4
45+	4	1.1
Total	**369**	

Table 5: Self Selection Questionnaire/Disability		
Disability	**Frequency**	**%**
Yes	4	1.1
No	365	98.9
Total	**369**	

Appendix B

Phase II Piloting Sample Statistics

B1 Demographics: Self Selection Questionnaire

Table 6: Self Selection Questionnaire/Brigade		
Brigade	**Number of Participants**	**%**
Hampshire	13	19.1
South Yorkshire	10	14.7
West Midlands	45	66.2
Total	**68**	

Table 7: Self Selection Questionnaire/Gender		
Gender	**Number of Participants**	**%**
Male	67	98.5
Female	1	1.5
Total	**68**	

Table 8: Self Selection Questionnaire/Ethnic Origin		
Ethnic Origin	**Number of Participants**	**%**
White	60	95.2
Black and Minority Ethnic	3	4.8
Undeclared	5	
Total	**68**	

Table 9: Self Selection Questionnaire/Age		
Age	**Number of Participants**	**%**
16-20	16	23.5
21-25	25	36.8
26-30	15	22.1
31-35	11	16.2
36-40	1	1.5
41-45	0	0.0
45+	0	0.0
Total	**68**	

Table 10: Self Selection Questionnaire/Disability		
Disability	**Number of Participants**	**%**
Yes	1	1.5
No	63	98.4
Undeclared	4	
Total	**68**	

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