

Safety Regulation Group



CAA PAPER 2003/12

**Introduction to the Safety Health of
Maintenance Engineering (SHoMe) Tool**

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Introduction to the Safety Health of Maintenance Engineering (SHoMe) Tool

1 Introduction

The UK CAA Safety Regulation Group has an active programme concerning human factors and safety management in maintenance, and played a key role in developing the JAR-145 amendment 5 requirements. In order to measure whether these, and other, initiatives resulted in safety improvements within maintenance organisations, the UK CAA contracted Steve Mason, of Health and Safety Engineering Consultants (HSEC), to identify indicators of 'safety health' and to develop a tool to enable these indicators to be measured. The aim was to apply the tool both before the introduction of human factors and safety management initiatives, and also afterwards, to measure whether there had been any improvements in safety health. Note: it is appreciated that many things could affect safety over a period of time, therefore the tool had to be sensitive enough to measure particular issues related closely to human factors.

The HSEC Safety Health of Maintenance Engineering (SHoMe) tool has been developed from existing tools, to be applicable to aviation maintenance. Whilst designed with large aircraft maintenance organisations in mind, it may nevertheless also be applicable to smaller companies, and companies whose work is not maintaining aircraft directly but in support of the industry.

The tool may be used as part of an audit, or as a stand-alone measure of the safety health of the company at any particular time. The tool has been piloted and trialled at 5 UK maintenance companies. The CAA plans to give out copies of the tool to all UK maintenance organisations, and hopes that they will elect to use it to highlight any potential safety-related issues which may exist, but which the company management may not know about.

The tool is intended to measure the "safety health" of an organisation, not "health and safety" associated with the protection of individual staff members.

2 Instructions for Application of the HSEC SHoMe Tool

In order to run the HSEC SHoMe tool, you will need (i) copies of the questionnaires, (ii) the SHoMe tool analysis software and (iii) the detailed user guide in order to input and interpret the results.

This tool has been developed for aircraft maintenance companies. If you do not maintain aircraft directly, but your business is connected with aircraft maintenance, you will first need to check the applicability of the questionnaires to your work. If the majority of the questions are applicable, you can still run the tool, just leaving out those questions which are not applicable. Alternatively, it may be possible to modify the questionnaire to fit your company. However, major modification may invalidate the scoring system built into the tool.

The tool can be used to measure safety health across the company as a whole, or at a particular base or outstation. It can even be used to measure safety health on a certain shift, if the shift population is fairly static and large enough to ensure that the opinions of individuals are not going to unduly sway the results.

The tool is based on subjective measurements, rather than objective performance measures. In order to produce valid results, it is important to stress the need for each

individual to complete the questionnaires honestly and as thoroughly as possible. Avoid applying the tool during periods of industrial unrest, as this is likely to bias results negatively.

You will need to give the questionnaires to a representative sample of the staff in the company. This means:

- a) a large enough sample (the greater the sample size, the more valid the results are likely to be);
- b) enough staff within each of the technical certifying staff, technical non-certifying staff and management and technical support staff groups to be representative of the company/base/ outstation;
- c) don't forget to include planners, technical services, storemen, senior managers, junior managers, QA, etc;
- d) staff with various attitudes - this includes the cynics and grumblers, as well as the upbeat, happy staff! If you run the questionnaire on just those staff you think won't 'rock the boat' you may not get a truthful picture of what is going on;
- e) staff across shifts;
- f) contract staff, if they have worked there long enough (they will have valuable experience from other companies against which to compare).

Brief staff first on what this is all about - assure them that it is anonymous and that the combined results will be used to improve company processes where possible (if that is your intention). The questionnaires will take some time to complete, so staff need to be assured that the results will be acted upon in some way, otherwise they won't bother.

If possible, pay staff for the time taken to complete the questionnaire, or make provision for it to be completed within work time (but individually).

Stress the importance of completing the questionnaire(s) as an individual - avoid situations whereby a group of staff all get together to discuss the questions and allow their answers to be influenced, or complete the questionnaire(s) by committee.

3 The Questionnaires

The basis of the tool is a set of questionnaires. The questionnaires are available on disc and can be freely copied. Spaces are left blank for companies to add their own company name on the covering pages. There are also spaces for the aircraft types that are maintained to be added to the second 'demographic' pages on each questionnaire. These should be completed before the questionnaires are printed and issued.

There are 3 sets of questionnaires, for:

- Technical Certifying staff (Typically Licensed engineers, JAR-145 B1/B2 Engineers)
- Technical Non-Certifying staff (Typically Delegated Tradesman or no certification authority)
- Management and Technical Support staff - engineering support (this includes all staff who are not involved in 'hands-on' maintenance of aircraft, e.g. managers, QA, stores, planning, tech records, tech services, supply, etc.)

Each category of staff is given a set of questionnaires to complete, according to Table 1.

Table 1 Questionnaires applicable to job categories

Function Type	Section 1 Generic Questionnaire	Section 2 Job Difficulty Questionnaire	Section 3 Organisational Questionnaire
Technical Certifying Staff	Version 1	Standard	Standard
Technical Non-Certifying Staff	Version 2	Standard	Standard
Management and Tech Support Staff	Version 3	Not Applicable	Not Applicable

It is important that each member of staff is issued the version of the questionnaire that is relevant to their job. For example, non-certifying staff should not be issued the version intended for the certifying staff.

After questionnaires have been collected from staff, the results need to be entered into the computer. The analysis software can then be run at several levels, increasing in detail, including output organised in line with the MEDA form (in case you wish to compare your MEDA results with those from the HSEC tool).

4 Results and Analysis

The analysis software in the tool will produce results at 4 levels of detail: Level 1 is the overall picture (the 19 major issues, or potential root causes of problems), Level 2 provides slightly more detail (with each issue broken down into sub-topics); Level 3 provides the most detailed results. In addition, the results can be printed in MEDA format, for those companies who may wish to compare their MEDA data with that from the HSEC SHoMe tool.

The detailed report (CAA Paper 2003/11) explains how the tool scores the results of the questionnaires, and how to enter the data. It also explains how to interpret the data. Level 1 and 2 results give scores out of 100 for each issue (or sub issue), where the score would be 0 if everyone strongly agreed with the 'correct' answer and 100 if everyone strongly agreed with the 'incorrect' answer. When interpreting the level 1 and 2 results, scores less than 35 may be interpreted as good, over 55 indicates that an issue is worthy of attention and over 65 indicates that it is worthy of concern. When interpreting the Level 3 results, numbers of 15 or less are probably acceptable but may still warrant some attention; numbers of 30 or higher are worthy of concern.

The tool has particular value when run more than once, with a time interval between times, where comparison of the results can show whether certain problems are getting better or worse.

5 The Software

The software is distributed free of charge to anyone who wishes to use it. No IT support is provided, however, although users are welcome to contact the CAA (osdhf@srg.caa.co.uk) if, after they have read the supporting user manuals distributed with the software, they still have questions concerning its use.

Companies are also welcome to modify the software to suit their particular needs, although attention is drawn to the caveats in paragraph 2 of this report.

Appendix 1 Questionnaire Set for Technical Certifying Staff

This questionnaire survey has been specifically developed for use in the aircraft maintenance industry to measure the 'safety health' of a company, and to highlight potential problem areas within the organisation (such as poor procedures). Your company management would not be running this questionnaire if they did not want to know this information, and act upon it. It is appreciated that some of the issues addressed by the questionnaires are outside the remit of the company, but will nevertheless provide useful feedback to the management as to where the problems (if any) lie.

This questionnaire is anonymous so please answer the following questions as honestly as you can. It will not be possible to identify the responses of any individual.

To help us gain the most from the results please also complete the following two pages which provides information on the nature of your job and your experience. If you are in a job where you think you can be identified from this data, then just fill in those parts that you are happy with.

Please complete the questionnaires on your own, without discussing your answers with colleagues. It is your view and experience which is important. Please return the completed questionnaire to the nominated co-ordinator as soon as possible.

The questionnaires will take about 30 minutes to complete, so please be patient! The results will all be analysed and you will be given feedback on the outcomes.

Thank you for your assistance.

Job Details

Date

Location:

Your Job:

Tick all those which apply – (Multiple Entries)

Management/management support staff:

- management
- quality assurance
- training
- planning
- technical services
- technical records
- supply chain

Technicians/maintenance personnel

- certifying staff/supervisor
- non certifying staff/mechanic
- contractor

The number of years you have worked in aircraft maintenance engineering

The number of years with this Company

The number of years in your current job/position , or with current responsibilities

The shifts you work:

- Permanent days
- Permanent nights
- Rotating shifts

Approx number of hours you work in typical week

- <40
- 40-50
- 50-60
- 60-70
- >70

Please tick if you have worked on any of the following aircraft in the past month:

Only worked on components off the aircraft	
--	--

{* this table is modified to include a full list of aircraft that are maintained by the company}

*		*	
*		*	
*		*	
*		*	
*		*	

Others: _____

Generic Questionnaire – (Technical Certifying Staff)

Please indicate the extent to which you agree or disagree with the following statements in relation to your work over the last month or so	strongly agree	agree	not sure	disagree	strongly disagree
Management and staff communicate well with each other					
Managers always let us know of important safety findings					
I am always properly briefed by those giving me a job					
Before I start a job I'm always given the necessary information					
I am fully aware of the contents of the Company's safety policy					
I know exactly what I am expected to do and my responsibilities					
I know those parts of my job where I can be held accountable					
I sometimes think my colleagues are confused over their exact roles and responsibilities					
There is often confusion between departments over some of their exact roles and responsibilities					
The procedures I use are accurate & complete					
The company provides me with all the information I need to do my job					
The procedures I use are clear and easy to understand					
I can easily identify where procedures have been revised					
The procedures I use are practical and easy to use					
The procedures I use always adopt 'best practice'					
We have a good system for reporting problems with maintenance manuals and documentation					
We have a good system for fixing problems with maintenance manuals and documentation					
We have systems in place to ensure that all the resources specified in the procedures are readily available					
I often have to rush jobs due to staff shortages					
Jobs are often delayed due to vital equipment being missing or in the wrong place					
I am often not given enough time to do the job					
We usually manage to complete a job despite the non-availability of the specified equipment/tools					
Jobs are often delayed due to a shortage of spares					
Aircraft are sometimes released even if some work can't be done due to parts shortages					
Some deadlines are unrealistic					

Please indicate the extent to which you agree or disagree with the following statements in relation to your work over the last month or so	strongly agree	agree	not sure	disagree	strongly disagree
We often have to rush jobs due to unrealistic deadlines					
There was pressure placed upon me to work additional hours when I felt that I was not at my best					
There were conflicting commercial & safety demands					
People who are prepared to cut corners seem to always get promoted					
I accept that changes to my job are necessary from time to time					
I am always willing to change the way I work to fit in with the Company requirements					
The training I receive is appropriate for the job I do					
Appropriate refresher, or continuation, training is regularly provided					
I am confident that I have the necessary experience/ qualifications for the work I do					
I am confident that all my colleagues understand the hazards & risks associated with maintaining aircraft					
I have a good knowledge of maintenance rules & procedures					
I would be confident flying in an aircraft on which my colleagues had worked after a maintenance check					
I am confident our managers have the necessary experience/ qualifications for the work they do					
I sometimes go to work when I am ill or feel less than 100%					
During the last month I have made an error in my work due to tiredness					
During the last month some of my colleagues have made errors in their work due to tiredness					
I often have to work long hours or a large amount of overtime					
My job can sometimes be physically tiring					
My working conditions often make it difficult for me to do my work properly					
Some tools could be better designed					
The aircraft could be better designed to allow maintenance					
Anyone who makes an error deserves to be disciplined					
My colleagues fully understand the implications of their actions on airworthiness and aviation safety					
All the people I work with are very safety conscious					

Please indicate the extent to which you agree or disagree with the following statements in relation to your work over the last month or so	strongly agree	agree	not sure	disagree	strongly disagree
People don't care about the job anymore - they just do it for the money					
It is the responsibility of the LAE to check that no one has made any errors - that's what he's paid for					
I find my work boring and unsatisfying					
It doesn't really matter if I make the odd mistake as my work is always checked					
Some procedures are often not fully followed by some people					
Some procedures are only there to protect management's back					
The real risks from us making mistakes are quite small					
My colleagues often do not follow some procedures					
I experience some pressure from my workmates to do things differently to the procedures					
Management regularly demonstrate their strong commitment to safety					
All my colleagues think management are strongly committed to safety					
We never see anyone in management where I work					
The management have no idea of what really goes on					
Management are happy to discuss any of our concerns					
My immediate boss sometimes pressures me not to follow maintenance procedures					
My immediate boss would approve of my actions if I did not follow procedures in order to get an aircraft away					
My immediate boss sometimes take risks in releasing aircraft when the maintenance has not been properly undertaken					
My immediate boss tends to give the best jobs to those who are willing to 'bend' procedures to get aircraft away earlier					
My immediate boss always take seriously any concerns I have over airworthiness					
My immediate boss is always there when I need him/her					
My immediate boss is effective at maintaining safety standards					
My immediate boss is very knowledgeable on maintenance issues					
I often have to complete work without adequate supervision					
My colleagues show a commitment to maintaining high standards of safety					

Please indicate the extent to which you agree or disagree with the following statements in relation to your work over the last month or so	strongly agree	agree	not sure	disagree	strongly disagree
Management continue to seek new ways of improving safety performance					
Management devote sufficient effort to improve safety performance in comparison to commercial improvements					
Management encourage us to report our errors					
If I report an error, I am confident I would be treated in a fair manner					
Management investigate incidents to understand weakness in safety procedures, not to discipline the person					
If I made an error which I didn't think would impact on airworthiness I would own up					
Jobs are often planned allowing insufficient time to do the job properly					
The role of the Quality Dept is vital					
The Quality Assurance process does not prevent errors.					
The company pays lip service to quality					

Job Difficulties Questionnaire – (Technical Certifying Staff)

This part of the tool is intended to identify any specific aspect of your job which is causing you particular difficulty.

You will probably have been involved in a range of tasks and therefore the first stage is to read down the list below and identify those job elements that you have been involved with over the last month (or so). All others are then ignored.

Please place a 'tick' in column 'A' for those activities which YOU ACTUALLY DID over the past month or so. Then ONLY FOR THOSE PARTS TICKED, indicate in columns 'B', 'C' or 'D' the level of difficulty you generally experienced performing these jobs.

For example, if in the last month you were involved in any aspect of 'planning' then you would place a tick in column 'A' on the first row, and:

- if planning your work gave no problems - tick 'B'
- if planning your work gave some problems - tick 'C'
- if planning your work gave you major problems - tick 'D'

However, if your work did not include planning then leave column 'A' blank and move on to the next issue.

	A Was this part of your Jobs?	B No problems	C Some problems	D Major problems
PLANNING: e.g. <ul style="list-style-type: none"> • Planning your work for each shift • Working to a plan developed by somebody else • Checking work previously done by other people 	Y/N			
PREPARATION: e.g. <ul style="list-style-type: none"> • Obtaining parts/tools/equipment - for planned tasks • Obtaining parts/tools/equipment - unplanned tasks • De-panelling/removing parts for access to work areas 	Y/N			
INSPECTION: e.g. <ul style="list-style-type: none"> • Determining the appropriate inspection standards • Physically carrying out inspections • Raising rectification and defect reports 	Y/N			
ROUTINE WORK: e.g. <ul style="list-style-type: none"> • Routine servicing, cleaning and lubrication • Making component changes • Using specialist tools/equipment • Using facilities for working at height 	Y/N			

	A Was this part of your Jobs?	B No problems	C Some problems	D Major problems
CHECKS & FUNCTIONAL TESTING: e.g. <ul style="list-style-type: none"> • Daily routine checks • Checking new parts • Arranging & performing tests to be undertaken • Checking work of non-certifying staff • Housekeeping following completion of job • Checking completed repairs 	Y/N			
NON – ROUTINE WORK: e.g. <ul style="list-style-type: none"> • Diagnosing faults • Carrying out modifications or service bulletins • Carrying out defect rectification 	Y/N			
USING MAINTENANCE DATA/MANUALS: e.g. <ul style="list-style-type: none"> • Using maintenance data • Using work cards • Using maintenance manual • Using company maintenance procedures • Using service bulletins/airworthiness directives • Using "in house" written modifications & inspection documents • Using computer based maintenance information 	Y/N			
UPDATING DOCUMENTATION & SYSTEMS: e.g. <ul style="list-style-type: none"> • Ensuring all work is completed before sign off • Informing others of work completed & sign off • Updating records, data bases etc 	Y/N			

Organisational Questionnaire – (Technical Certifying Staff)

Please read the following list and put a tick against anything which, during the last 6 months or so, has:	
<ul style="list-style-type: none"> • caused you or a colleague to make a mistake or • caused you or a colleague confusion or uncertainty over a job(s) or • otherwise affected airworthiness 	
The type of documentation you have to use given your working conditions	
The ease with which general written procedures can be understood	
The amount of jargon and ambiguity contained in the procedures	
The ease with which service instructions can be understood	
The ease with which service bulletins can be understood	
The ease with which diagrams and pictures can be understood	
The general design and layout of written procedures	
Ambiguity as a result of different layouts of different types of forms you use	
The standard of legibility of printed and written material	
System for implementing temporary revisions to Maintenance Manuals	
Absence of temporary revisions to the Maintenance Manual concerning known problems	
The effectiveness of the temporary revisions to Maintenance Manuals (MMTR)	
Previously encountered problems were not highlighted	
Distractions and interruptions while you are working	
The general space in and around the aircraft	
Noisy working environments	
Exposure to airborne contaminants	
The temperatures you have to work in	
The general amount of lighting in and around the aircraft	
The presence of glare or dazzling light sources near to your work area	
The potential to be exposed to wind/rain/moisture when working	
The quality and suitability of any protective equipment you use/wear	
The standard of housekeeping adopted by other engineers/technicians	
Systems for prioritising jobs	
The ability of planners to minimise jobs running over other shifts	
The clarity of jobs to which you are assigned	
The system for informing you of any updates to procedures	
The staffing levels allocated to each job	
The financial resource made available to each job	
The general availability of conventional tools & equipment	
The general availability of specialist tools & equipment	
Effectiveness of preparation of tools, parts and data	
The ease with which you obtain necessary spare parts	
The shift systems adopted by your company	

The amount of work scheduled to be completed in your shift	
Any general time pressure to meet deadlines	
Any pressure put on you from the aircraft operators	
Any pressure put on you from your supervisor or management	
The amount of work your immediate boss expects you to achieve in a shift	
Access for inspection & testing	
Access for fitting parts and repairs including space to use tools	
The level of complexity of the aircraft design	
Differences in designs between different aircraft which could cause confusion	
The standard of the labelling of parts	
The legibility of labels under all weather conditions	
Design features which allow/prevent parts being fitted incorrectly	
The postures you need to adopt to conduct the maintenance work	
The suitability of the tools & equipment for the jobs & working conditions	
The general condition & calibration of the tools & equipment you use	
The design of the tools & equipment you use	
The ease with which tools can be used	
The availability of 'quiet room' facilities to allow discussions with your colleagues	
The availability and suitability of personal storage space	
The general design and layout of your hanger/work area	
The manoeuvrability of equipment and access devices	
The ease with which you communicate with other engineers in your team	
The effectiveness of communications with other shifts	
The amount of time devoted to formal handover communication with the next shift	
The effectiveness of communications between you and your supervisor	
The effectiveness of communication between flight crews and maintenance crews	
The quality and ability of the supervisors	
The effectiveness of supervisors in enforcing good working practices	
The presence of supervisors who knowingly permit un-approved working practices	
The presence of supervisors who direct you to adopt 'non-approved' practices	
Lack of trust in your immediate boss	
The competency of newly promoted supervisors	
The quality and ability of management	
The amount of responsibility and authority delegated to you by management	
The presence of any managers who direct you to adopt 'non-approved' practices	
Lack of management support in resolving problems	
The willingness of your workmates or supervisor to discuss your problems	
Your willingness to raise any problems you have with your workmates	
Your knowledge of the company processes or company procedures	
Your knowledge of the aircraft systems you recently worked on	
Your knowledge of the detailed maintenance task requirements	

Your ability to retain information 'in your head'	
Your understanding of what could increase the likelihood of you making an error	
How the content of recent training and recurrent training met your own needs	
The planned times between recurrent/refresher training courses	
Your past 'on-the-job' experiences of these jobs	
Your skills in fault isolation and troubleshooting	
Your skills in testing	
Your skills in fitting parts/making adjustments	
Your skills in using computer based maintenance manuals	
Your ability to correctly use the tools and equipment	
The amount of recent opportunity you have had to practice these skills	
Your ability to deal with very complex tasks	
The numbers of skills you need to possess to do your work	
Your ability to avoid or deal with personal conflicts with others	
Your ability to assert yourself and not allow others to compromise your own standards	
Your strength and/or body size	
Your eyesight and colour vision	
Your ability to maintain good levels of concentration	
Any domestic or other non-work concerns	
Your willingness to be honest with others about any mistakes you may have made	
The clarity of the procedures for reporting safety concerns	
The way management treat individuals who report mistakes or safety concerns	
The extent to which you think senior managers are willing to accept criticism	

Thank you for completing these questionnaires.

Please add any further comments you may wish to make.

Appendix 2 Questionnaire Set for Technical Non-Certifying Staff

This questionnaire survey has been specifically developed for use in the aircraft maintenance industry to measure the 'safety health' of a company, and to highlight potential problem areas within the organisation (such as poor procedures). Your company management would not be running this questionnaire if they did not want to know this information, and act upon it. It is appreciated that some of the issues addressed by the questionnaires are outside the remit of the company, but will nevertheless provide useful feedback to the management as to where the problems (if any) lie.

This questionnaire is anonymous so please answer the following questions as honestly as you can. It will not be possible to identify the responses of any individual.

To help us gain the most from the results please also complete the following two pages which provides information on the nature of your job and your experience. If you are in a job where you think you can be identified from this data, then just fill in those parts that you are happy with.

Please complete the questionnaires on your own, without discussing your answers with colleagues. It is your view and experience which is important. Please return the completed questionnaire to the nominated co-ordinator as soon as possible.

The questionnaires will take about 30 minutes to complete, so please be patient! The results will all be analysed and you will be given feedback on the outcomes.

Thank you for your assistance.

Job Details

Date

Location:

Your Job:

Tick all those which apply – (Multiple Entries)

Management/management support staff:

- management
- quality assurance
- training
- planning
- technical services
- technical records
- supply chain

Technicians/maintenance personnel

- certifying staff/supervisor
- non certifying staff/mechanic
- contractor

The number of years you have worked in aircraft maintenance engineering

The number of years with this Company

The number of years in your current job/position , or with current responsibilities

The shifts you work:

Permanent days

Permanent nights

Rotating shifts

Approx number of hours you work in typical week

<40

40-50

50-60

60-70

>70

Please tick if you have worked on any of the following aircraft in the past month:

Only worked on components off the aircraft	
--	--

{* this table is modified to include a full list of aircraft that are maintained by the company}

*		*	
*		*	
*		*	
*		*	
*		*	

Others: _____

Generic Questionnaire – (Technical Non-Certifying Staff)

Please indicate the extent to which you agree or disagree with the following statements in relation to your work over the last month or so	strongly agree	agree	not sure	disagree	strongly disagree
Management and staff communicate well with each other					
Managers always let us know of important safety findings					
I am always properly briefed by those giving me a job					
Before I start a job I'm always given the necessary information					
I am fully aware of the contents of the Company's safety policy					
I know exactly what I am expected to do and my responsibilities					
I know those parts of my job where I can be held accountable					
I sometimes think my colleagues are confused over their exact roles and responsibilities					
There is often confusion between departments over some of their exact roles and responsibilities					
The procedures I use are accurate & complete					
The company provides me with all the information I need to do my job					
The procedures I use are clear and easy to understand					
I can easily identify where procedures have been revised					
The procedures I use are practical and easy to use					
The procedures I use always adopt 'best practice'					
We have a good system for reporting problems with maintenance manuals and documentation					
We have a good system for fixing problems with maintenance manuals and documentation					
We have systems in place to ensure that all the resources specified in the procedures are readily available					
I often have to rush jobs due to staff shortages					
Jobs are often delayed due to vital equipment being missing or in the wrong place					
I am often not given enough time to do the job					
We usually manage to complete a job despite the non-availability of the specified equipment/tools					
Jobs are often delayed due to a shortage of spares					

Please indicate the extent to which you agree or disagree with the following statements in relation to your work over the last month or so	strongly agree	agree	not sure	disagree	strongly disagree
Aircraft are sometimes released even if some work can't be done due to parts shortages					
Some deadlines are unrealistic					
We often have to rush jobs due to unrealistic deadlines					
There was pressure placed upon me to work additional hours when I felt that I was not at my best					
There were conflicting commercial & safety demands					
People who are prepared to cut corners seem to always get promoted					
I accept that changes to my job are necessary from time to time					
I am always willing to change the way I work to fit in with the Company requirements					
The training I receive is appropriate for the job I do					
Appropriate refresher, or continuation, training is regularly provided					
I am confident that I have the necessary experience/ qualifications for the work I do					
I am confident that all my colleagues understand the hazards & risks associated with maintaining aircraft					
I have a good knowledge of maintenance rules & procedures					
I would be confident flying in an aircraft on which my colleagues had worked after a maintenance check					
I am confident our managers have the necessary experience/qualifications for the work they do					
I sometimes go to work when I am ill or feel less than 100%					
During the last month I have made an error in my work due to tiredness					
During the last month some of my colleagues have made errors in their work due to tiredness					
I often have to work long hours or a large amount of overtime					
My job can sometimes be physically tiring					
My working conditions often make it difficult for me to do my work properly					
Some tools could be better designed					

Please indicate the extent to which you agree or disagree with the following statements in relation to your work over the last month or so	strongly agree	agree	not sure	disagree	strongly disagree
The aircraft could be better designed to allow maintenance					
Anyone who makes an error deserves to be disciplined					
My colleagues fully understand the implications of their actions on airworthiness and aviation safety					
All the people I work with are very safety conscious					
People don't care about the job anymore - they just do it for the money					
It is the responsibility of the LAE to check that no one has made any errors - that's what he's paid for					
I find my work boring and unsatisfying					
It doesn't really matter if I make the odd mistake as my work is always checked					
Some procedures are often not fully followed by some people					
Some procedures are only there to protect management's back					
The real risks from us making mistakes are quite small					
My colleagues often do not follow some procedures					
I experience some pressure from my workmates to do things differently to the procedures					
Management regularly demonstrate their strong commitment to safety					
All my colleagues think management are strongly committed to safety					
We never see anyone in management where I work					
The management have no idea of what really goes on					
Management are happy to discuss any of our concerns					
My immediate boss sometimes pressures me not to follow maintenance procedures					
My immediate boss would approve of my actions if I did not follow procedures in order to get an aircraft away					
My immediate boss sometimes take risks in releasing aircraft when the maintenance has not been properly undertaken					
My immediate boss tends to give the best jobs to those who are willing to 'bend' procedures to get aircraft away earlier					

Please indicate the extent to which you agree or disagree with the following statements in relation to your work over the last month or so	strongly agree	agree	not sure	disagree	strongly disagree
My immediate boss always take seriously any concerns I have over airworthiness					
My immediate boss is always there when I need him/her					
My immediate boss is effective at maintaining safety standards					
My immediate boss is very knowledgeable on maintenance issues					
I often have to complete work without adequate supervision					
My colleagues show a commitment to maintaining high standards of safety					
Management continue to seek new ways of improving safety performance					
Management devote sufficient effort to improve safety performance in comparison to commercial improvements					
Management encourage us to report our errors					
If I report an error, I am confident I would be treated in a fair manner					
Management investigate incidents to understand weakness in safety procedures, not to discipline the person					
If I made an error which I didn't think would impact on airworthiness I would own up					
Jobs are often planned allowing insufficient time to do the job properly					
The role of the Quality Dept is vital					
The Quality Assurance process does not prevent errors.					
The company pays lip service to quality					

Job Difficulties Questionnaire – (Technical Non-Certifying Staff)

This part of the tool is intended to identify any specific aspect of your job which is causing you particular difficulty.

You will probably have been involved in a range of tasks and therefore the first stage is to read down the list on the next page and identify those job elements that you have been involved with over the last month (or so). All others are then ignored.

Please place a 'tick' in column 'A' for those activities which YOU ACTUALLY DID over the past month or so. Then ONLY FOR THOSE PARTS TICKED, indicate in columns 'B', 'C' or 'D' the level of difficulty you generally experienced performing these jobs.

For example, if in the last month you were involved in any aspect of 'planning' then you would place a tick in column 'A' on the first row, and:

- if planning your work gave no problems - tick 'B'
- if planning your work gave some problems - tick 'C'
- if planning your work gave you major problems - tick 'D'

However, if your work did not include planning then leave column 'A' blank and move on to the next issue.

	A Was this part of your Jobs?	B No problems	C Some problems	D Major problems
PLANNING: e.g. <ul style="list-style-type: none"> • Planning your work for each shift • Working to a plan developed by somebody else • Checking work previously done by other people 	Y/N			
PREPARATION: e.g. <ul style="list-style-type: none"> • Obtaining parts/tools/equipment - for planned tasks • Obtaining parts/tools/equipment - unplanned tasks • De-panelling/removing parts for access to work areas 	Y/N			
INSPECTION: e.g. <ul style="list-style-type: none"> • Determining the appropriate inspection standards • Physically carrying out inspections • Raising rectification and defect reports 	Y/N			
ROUTINE WORK: e.g. <ul style="list-style-type: none"> • Routine servicing, cleaning and lubrication • Making component changes • Using specialist tools/equipment • Using facilities for working at height 	Y/N			

	A Was this part of your Jobs?	B No problems	C Some problems	D Major problems
CHECKS & FUNCTIONAL TESTING: e.g. <ul style="list-style-type: none"> • Daily routine checks • Checking new parts • Arranging & performing tests to be undertaken • Checking work of non-certifying staff • Housekeeping following completion of job • Checking completed repairs 	Y/N			
NON – ROUTINE WORK: e.g. <ul style="list-style-type: none"> • Diagnosing faults • Carrying out modifications or service bulletins • Carrying out defect rectification 	Y/N			
USING MAINTENANCE DATA/MANUALS: e.g. <ul style="list-style-type: none"> • Using maintenance data • Using work cards • Using maintenance manual • Using company maintenance procedures • Using service bulletins/airworthiness directives • Using "in house" written modifications & inspection documents • Using computer based maintenance information 	Y/N			
UPDATING DOCUMENTATION & SYSTEMS: e.g. <ul style="list-style-type: none"> • Ensuring all work is completed before sign off • Informing others of work completed & sign off • Updating records, data bases etc. 	Y/N			

Organisational Questionnaire – (Technical Non-Certifying Staff)

Please read the following list and put a tick against anything which, during the last 6 months or so, has:	
<ul style="list-style-type: none"> • caused you or a colleague to make a mistake or • caused you or a colleague confusion or uncertainty over a job(s) or • otherwise affected airworthiness 	
The type of documentation you have to use given your working conditions	
The ease with which general written procedures can be understood	
The amount of jargon and ambiguity contained in the procedures	
The ease with which service instructions can be understood	
The ease with which service bulletins can be understood	
The ease with which diagrams and pictures can be understood	
The general design and layout of written procedures	
Ambiguity as a result of different layouts of different types of forms you use	
The standard of legibility of printed and written material	
System for implementing temporary revisions to Maintenance Manuals	
Absence of temporary revisions to the Maintenance Manual concerning known problems	
The effectiveness of the temporary revisions to Maintenance Manuals (MMTR)	
Previously encountered problems were not highlighted	
Distractions and interruptions while you are working	
The general space in and around the aircraft	
Noisy working environments	
Exposure to airborne contaminants	
The temperatures you have to work in	
The general amount of lighting in and around the aircraft	
The presence of glare or dazzling light sources near to your work area	
The potential to be exposed to wind/rain/moisture when working	
The quality and suitability of any protective equipment you use/wear	
The standard of housekeeping adopted by other engineers/technicians	
Systems for prioritising jobs	
The ability of planners to minimise jobs running over other shifts	
The clarity of jobs to which you are assigned	
The system for informing you of any updates to procedures	
The staffing levels allocated to each job	
The financial resource made available to each job	
The general availability of conventional tools & equipment	
The general availability of specialist tools & equipment	
Effectiveness of preparation of tools, parts and data	
The ease with which you obtain necessary spare parts	
The shift systems adopted by your company	

The amount of work scheduled to be completed in your shift	
Any general time pressure to meet deadlines	
Any pressure put on you from the aircraft operators	
Any pressure put on you from your supervisor or management	
The amount of work your immediate boss expects you to achieve in a shift	
Access for inspection & testing	
Access for fitting parts and repairs including space to use tools	
The level of complexity of the aircraft design	
Differences in designs between different aircraft which could cause confusion	
The standard of the labelling of parts	
The legibility of labels under all weather conditions	
Design features which allow/prevent parts being fitted incorrectly	
The postures you need to adopt to conduct the maintenance work	
The suitability of the tools & equipment for the jobs & working conditions	
The general condition & calibration of the tools & equipment you use	
The design of the tools & equipment you use	
The ease with which tools can be used	
The availability of 'quiet room' facilities to allow discussions with your colleagues	
The availability and suitability of personal storage space	
The general design and layout of your hanger/work area	
The manoeuvrability of equipment and access devices	
The ease with which you communicate with other engineers in your team	
The effectiveness of communications with other shifts	
The amount of time devoted to formal handover communication with the next shift	
The effectiveness of communications between you and your supervisor	
The effectiveness of communication between flight crews and maintenance crews	
The quality and ability of the supervisors	
The effectiveness of supervisors in enforcing good working practices	
The presence of supervisors who knowingly permit un-approved working practices	
The presence of supervisors who direct you to adopt 'non-approved' practices	
Lack of trust in your immediate boss	
The competency of newly promoted supervisors	
The quality and ability of management	
The amount of responsibility and authority delegated to you by management	
The presence of any managers who direct you to adopt 'non-approved' practices	
Lack of management support in resolving problems	
The willingness of your workmates or supervisor to discuss your problems	
Your willingness to raise any problems you have with your workmates	
Your knowledge of the company processes or company procedures	
Your knowledge of the aircraft systems you recently worked on	
Your knowledge of the detailed maintenance task requirements	

Your ability to retain information 'in your head'	
Your understanding of what could increase the likelihood of you making an error	
How the content of recent training and recurrent training met your own needs	
The planned times between recurrent/refresher training courses	
Your past 'on-the-job' experiences of these jobs	
Your skills in fault isolation and troubleshooting	
Your skills in testing	
Your skills in fitting parts/making adjustments	
Your skills in using computer based maintenance manuals	
Your ability to correctly use the tools and equipment	
The amount of recent opportunity you have had to practice these skills	
Your ability to deal with very complex tasks	
The numbers of skills you need to possess to do your work	
Your ability to avoid or deal with personal conflicts with others	
Your ability to assert yourself and not allow others to compromise your own standards	
Your strength and/or body size	
Your eyesight and colour vision	
Your ability to maintain good levels of concentration	
Any domestic or other non-work concerns	
Your willingness to be honest with others about any mistakes you may have made	
The clarity of the procedures for reporting safety concerns	
The way management treat individuals who report mistakes or safety concerns	
The extent to which you think senior managers are willing to accept criticism	

Thank you for completing these questionnaires.

Please add any further comments you may wish to make.

Appendix 3 Questionnaire Set for Management and Technical Support Staff

This questionnaire survey has been specifically developed for use in the aircraft maintenance industry to measure the 'safety health' of a company, and to highlight potential problem areas within the organisation (such as poor procedures). Your company management would not be running this questionnaire if they did not want to know this information, and act upon it. It is appreciated that some of the issues addressed by the questionnaires are outside the remit of the company, but will nevertheless provide useful feedback to the management as to where the problems (if any) lie.

This questionnaire is anonymous so please answer the following questions as honestly as you can. It will not be possible to identify the responses of any individual.

To help us gain the most from the results please also complete the following two pages which provides information on the nature of your job and your experience. If you are in a job where you think you can be identified from this data, then just fill in those parts that you are happy with.

Please complete the questionnaires on your own, without discussing your answers with colleagues. It is your view and experience which is important. Please return the completed questionnaire to the nominated co-ordinator as soon as possible.

The questionnaires will take about 15 minutes to complete, so please be patient! The results will all be analysed and you will be given feedback on the outcomes.

Thank you for your assistance.

Job Details

Date

Location:

Your Job:

Tick all those which apply – (Multiple Entries)

Management/management support staff:

- management
- quality assurance
- training
- planning
- technical services
- technical records
- supply chain

Technicians/maintenance personnel

- certifying staff/supervisor
- non certifying staff/mechanic
- contractor

The number of years you have worked in aircraft maintenance engineering

The number of years with this Company

The number of years in your current job/position , or with current responsibilities

The shifts you work:

Permanent days

Permanent nights

Rotating shifts

Approx number of hours you work in typical week

<40

40-50

50-60

60-70

>70

Please tick if you have worked on any of the following aircraft in the past month:

Only worked on components off the aircraft	
--	--

{* this table is modified to include a full list of aircraft that are maintained by the company}

*		*	
*		*	
*		*	
*		*	
*		*	

Others: _____

Generic Questionnaire – (Management and Technical Support Staff)

Please indicate the extent to which you agree or disagree with the following statements in relation to your work over the last month or so	strongly agree	agree	not sure	disagree	strongly disagree
Management and staff communicate well with each other					
Managers always let us know of important safety findings					
I am always properly briefed by those giving me a job					
Before I start a job I'm always given the necessary information					
I am fully aware of the contents of the Company's safety policy					
I know exactly what I am expected to do and my responsibilities					
I know those parts of my job where I can be held accountable					
I sometimes think my colleagues are confused over their exact roles and responsibilities					
There is often confusion between departments over some of their exact roles and responsibilities					
The procedures I use are accurate & complete					
The company provides me with all the information I need to do my job					
The procedures I use are clear and easy to understand					
I can easily identify where procedures have been revised					
The procedures I use are practical and easy to use					
The procedures I use always adopt 'best practice'					
We have a good system for reporting problems with maintenance manuals and documentation					
We have a good system for fixing problems with maintenance manuals and documentation					
We have systems in place to ensure that all the resources specified in the procedures are readily available					
I often have to rush jobs due to staff shortages					
Jobs are often delayed due to vital equipment being missing or in the wrong place					
I am often not given enough time to do the job					
We usually manage to complete a job despite the non-availability of the specified equipment/tools					
Jobs are often delayed due to a shortage of spares					

Please indicate the extent to which you agree or disagree with the following statements in relation to your work over the last month or so	strongly agree	agree	not sure	disagree	strongly disagree
Aircraft are sometimes released even if some work can't be done due to parts shortages					
Some deadlines are unrealistic					
We often have to rush jobs due to unrealistic deadlines					
There was pressure placed upon me to work additional hours when I felt that I was not at my best					
There were conflicting commercial & safety demands					
People who are prepared to cut corners seem to always get promoted					
I accept that changes to my job are necessary from time to time					
I am always willing to change the way I work to fit in with the Company requirements					
The training I receive is appropriate for the job I do					
Appropriate refresher, or continuation, training is regularly provided					
I am confident that I have the necessary experience/ qualifications for the work I do					
I am confident that all my colleagues understand the hazards & risks associated with maintaining aircraft					
I have a good knowledge of maintenance rules & procedures					
I would be confident flying in an aircraft on which my colleagues had worked after a maintenance check					
I am confident our managers have the necessary experience/qualifications for the work they do					
I sometimes go to work when I am ill or feel less than 100%					
During the last month I have made an error in my work due to tiredness					
During the last month some of my colleagues have made errors in their work due to tiredness					
I often have to work long hours or a large amount of overtime					
My job can sometimes be physically tiring					
My working conditions often make it difficult for me to do my work properly					
Some tools could be better designed					

Please indicate the extent to which you agree or disagree with the following statements in relation to your work over the last month or so	strongly agree	agree	not sure	disagree	strongly disagree
The aircraft could be better designed to allow maintenance					
Anyone who makes an error deserves to be disciplined					
My colleagues fully understand the implications of their actions on airworthiness and aviation safety					
All the people I work with are very safety conscious					
People don't care about the job anymore - they just do it for the money					
It is the responsibility of the LAE to check that no one has made any errors - that's what he's paid for					
I find my work boring and unsatisfying					
It doesn't really matter if I make the odd mistake as my work is always checked					
Some procedures are often not fully followed by some people					
Some procedures are only there to protect management's back					
The real risks from us making mistakes are quite small					
My colleagues often do not follow some procedures					
I experience some pressure from my workmates to do things differently to the procedures					
Management regularly demonstrate their strong commitment to safety					
All my colleagues think management are strongly committed to safety					
We never see anyone in management where I work					
The management have no idea of what really goes on					
Management are happy to discuss any of our concerns					
My immediate boss sometimes pressures me not to follow maintenance procedures					
My immediate boss would approve of my actions if I did not follow procedures in order to get an aircraft away					
My immediate boss sometimes take risks in releasing aircraft when the maintenance has not been properly undertaken					
My immediate boss tends to give the best jobs to those who are willing to 'bend' procedures to get aircraft away earlier					

Please indicate the extent to which you agree or disagree with the following statements in relation to your work over the last month or so	strongly agree	agree	not sure	disagree	strongly disagree
My immediate boss always take seriously any concerns I have over airworthiness					
My immediate boss is always there when I need him/her					
My immediate boss is effective at maintaining safety standards					
My immediate boss is very knowledgeable on maintenance issues					
I often have to complete work without adequate supervision					
My colleagues show a commitment to maintaining high standards of safety					
Management continue to seek new ways of improving safety performance					
Management devote sufficient effort to improve safety performance in comparison to commercial improvements					
Management encourage us to report our errors					
If I report an error, I am confident I would be treated in a fair manner					
Management investigate incidents to understand weakness in safety procedures, not to discipline the person					
If I made an error which I didn't think would impact on airworthiness I would own up					
Jobs are often planned allowing insufficient time to do the job properly					
The role of the Quality Dept is vital					
The Quality Assurance process does not prevent errors.					
The company pays lip service to quality					

Thank you for completing these questionnaires.

Please add any further comments you may wish to make.