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**Evaluation of the slips assessment tool (SAT) -
analysis of user questionnaires**

HSL/2006/76

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EXECUTIVE SUMMARY

The SAT (Slips Assessment Tool) is a freely downloadable computer software package that allows an operator to assess the slip potential of pedestrian walkway surfaces. An online questionnaire was developed and hosted on the SAT website in order to assess the usefulness of the SAT and identify any user suggested improvements.

Objectives

This report details the development of and results from the online questionnaire. The data from the questionnaire was collected between 13/12/2005 and 07/06/2006.

Main Findings

The information obtained from the questionnaire included:

- The ease of downloading and installing the SAT software
- The usefulness of the SAT and associated explanatory material
- The usefulness of the SAT helpline
- The type and reliability of the meters that non-regulatory operators were using
- The type and number of assessments operators were undertaking
- How slip risks had been reduced by using SAT
- How the SAT can be improved

Two versions of the questionnaire were created in order to differentiate between regulatory (HSE and Local Authority inspectors) and non-regulatory respondents. Both are hosted on the SAT Internet site, <http://www.hsesat.info> with the regulatory version 'hidden' to help prevent non-regulatory users completing it.

Several methods of advertising the questionnaire were used including mail shots and adding information on appropriate websites. A total of 101 respondents completed the questionnaire, which although a relatively small number it was sufficient to obtain meaningful data.

Overall the results were positive with the majority of respondents finding that the SAT was a useful tool. Many respondents made suggestions for additional features that they would like included in the next software release, the main one being the ability to print the bar graph included in the SAT.

Recommendations

The results obtained from this questionnaire will be used to improve the SAT in future releases. It may be useful to repeat the exercise sometime after the next release.

1 INTRODUCTION

The SAT (Slips Assessment Tool) is a freely downloadable computer software package that allows an operator to assess the slip potential of pedestrian walkway surfaces. It was launched on the Internet in November 2004 via the dedicated website <http://www.hsesat.info>. Users are encouraged to register on this website so that they can be contacted should the need arise.

SAT users can be grouped into 2 categories:

- Those with regulatory responsibilities. These are either HSE or Local Authority Environmental Health Officers (EHOs) and are not expected to have registered. For the purpose of this report, this group is referred to as regulatory respondents. Regulatory operators use a Taylor Hobson Surtronic Duo meter to measure the surface roughness.
- Those without regulatory responsibilities. This group consists of any other SAT user and can include health and safety personnel working for individual companies, health and safety contractors etc. Non-regulatory operators can use any suitable meter. For the purpose of this report, this group is referred to as non-regulatory respondents.

A project requirement was to assess the usefulness of the SAT and also to determine if there are any problems or requested improvements. It was decided that the best way to obtain this information was to develop an online questionnaire. The advantages of using an online questionnaire as opposed to more traditional questionnaires (paper based, telephone) include:

- Flexibility - the respondent can choose when (and to some degree, where) to complete it
- Speed - results can be obtained as soon as questionnaires are completed
- Cost - an online questionnaire is a cost efficient way to collect data
- Accessibility - any interested party can complete the questionnaire

It was also decided to have 2 questionnaires, one for each group of respondents detailed above. The main difference between the questionnaires is that the regulatory version does not include questions about the type of meter or registration, as this group will be using the Surtronic Duo meter and not expected to have registered.

2 QUESTIONNAIRE DESIGN

2.1 QUESTIONS TO INCLUDE

The first task was to decide the questions to be included in the questionnaires. After discussions between the customer John Worth (HSE IR5), Richard Snodgrass (HSL, Work Psychology) and Chris Boorman (HSL, Software and Control) it was agreed that the information to be obtained should include:

- The ease of downloading and installing the SAT software
- The usefulness of the SAT and associated explanatory material
- The usefulness of the SAT helpline
- The type and reliability of the meters that non-regulatory operators were using
- The type and number of assessments operators were undertaking
- How slip risks had been reduced by using SAT
- How the SAT can be improved

Richard Snodgrass and John Worth produced the questions for both questionnaires.

Multiple-choice and 'Yes/No' type questions were used wherever possible in order to simplify questionnaire completion and analysis. However, several questions did require 'free' text to be entered.

2.2 QUESTIONNAIRE DEVELOPMENT

The questionnaire consists of 2 main components: a 'front-end' user interface to provide a means of entering the data and a 'back-end' database to store the results. As previously indicated, the questionnaire was to be hosted on the Internet and therefore a browser-based front-end was required. This was developed using Macromedia's 'Dreamweaver' and utilised Active Server Pages (ASP) to communicate with the back-end.

The back-end was developed using Access 2000 due to its familiarity and compatibility with existing systems. Two main tables were used in the database, one for each of the respondent groups.

Error checking was included on the front-end to ensure that all mandatory sections of the questionnaire were completed and a prompt given when submitting the questionnaire if this had not been done.

Michael Wall (HSL, Software and Control section) developed the front and back ends.

Another consideration was where to host the questionnaire. The SAT website was chosen as the obvious place as this is the main online presence for SAT related information. Only the non-regulatory operators questionnaire was publicised on the site to as it was decided to 'hide' the regulatory operators questionnaire. The addresses of the questionnaires are as follows:

- Non-regulatory: <http://www.hsesat.info/NonHseQuestionnaire.asp>
- Regulatory: <http://www.hsesat.info/HseQuestionnaire.asp>

2.3 PUBLICISING THE QUESTIONNAIRE

Several methods were used in order to publicise the availability of the questionnaires. A ‘News Item’ was added to the SAT homepage (see figure 1) and a mail shot was deployed to registered users. This was staggered over a number of days to help prevent overloading of the system, particularly the Access database, and was primarily aimed at non-regulatory users.

The regulatory questionnaire was publicised through the HSE Intranet. The S&T Programme Team also prepared a news item for the LAU newsletter but this does not appear to have been published. Therefore many EHOs may not have been informed about the questionnaire despite the efforts to contact them.

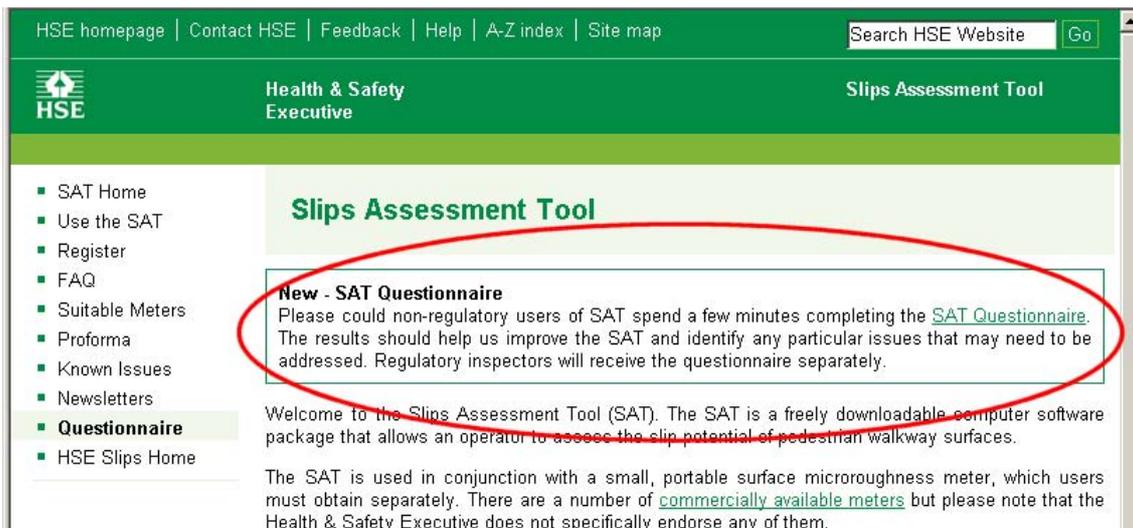


Figure 1– News item on SAT homepage

3 RESULTS

An additional Access 2000 database was developed to analyse the questionnaire. This consisted of a report based on a number of queries that obtained the data from the 'back-end' database. Where appropriate, the responses have been split into regulatory and non-regulatory groups. The results were collected between 13/12/2005 and 07/06/2006.

3.1 NUMBER OF RESPONDENTS

The number of respondents is shown in figure 2.

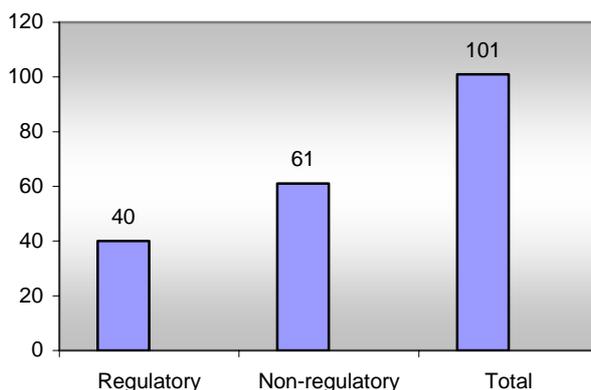


Figure 2 – Number of respondents

This is only a small proportion of SAT users but it is sufficient to obtain meaningful data.

3.2 Q1 - I HAVE DOWNLOADED THE SAT SOFTWARE FROM THE HSE WEB-SITE

The respondents had a choice of selecting either 'Yes or 'No'. This question could not be left unanswered and the results are shown in figure 3.

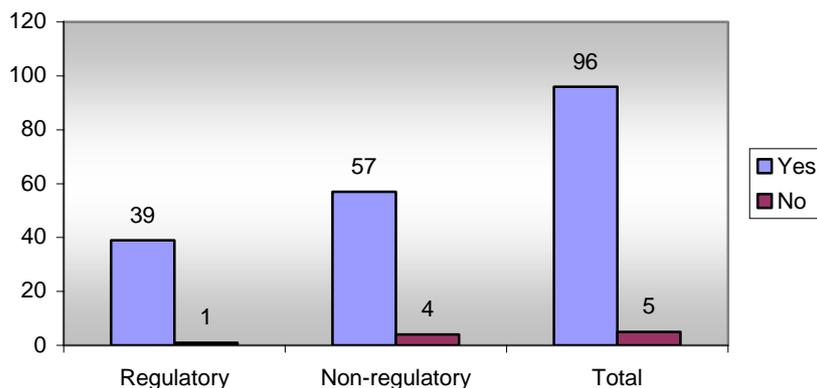


Figure 3 – Number of respondents who downloaded the SAT software

From figure 3 it can be seen that the large majority of respondents have downloaded the software. Those that did not download it either obtained it from a colleague or requested a CD.

3.3 Q2 - IF 'YES' TO Q.1 DID YOU ENCOUNTER ANY PROBLEMS DOWNLOADING THE SAT?

The respondents had a choice of selecting either 'Yes' or 'No'. This question could not be left unanswered if the respondent had selected 'Yes' to question 1 and the results are shown in figure 4.

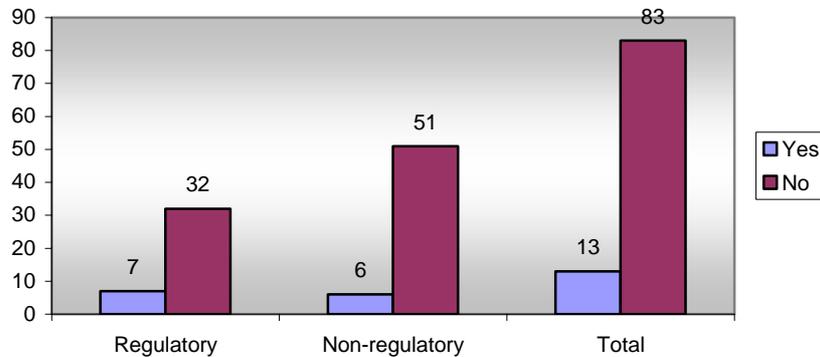


Figure 4 – Respondents encountering download problems

Most respondents did not encounter problems downloading the SAT. The comments from those that did, see Appendix A, suggest that one cause was that their company's IT policy prevented users downloading programs. In this case the user can request a CD via the SAT helpline.

Some respondents could not extract the SAT program because they did not have 'WinZip.' In these cases the user can request a CD with the files already extracted.

It is also apparent that some users had problems with the instructions and these may be reviewed and modified as appropriate.

3.4 Q3 - HAVE YOU REGISTERED THE SAT?

This question was only included in the non-regulatory questionnaire. Non-regulatory users are encouraged to register the SAT online (<http://www.hsesat.info/satregister.asp>) but it is not mandatory.

The respondents had a choice of selecting either 'Yes' or 'No'. This question could not be left unanswered and the results are shown in figure 5.

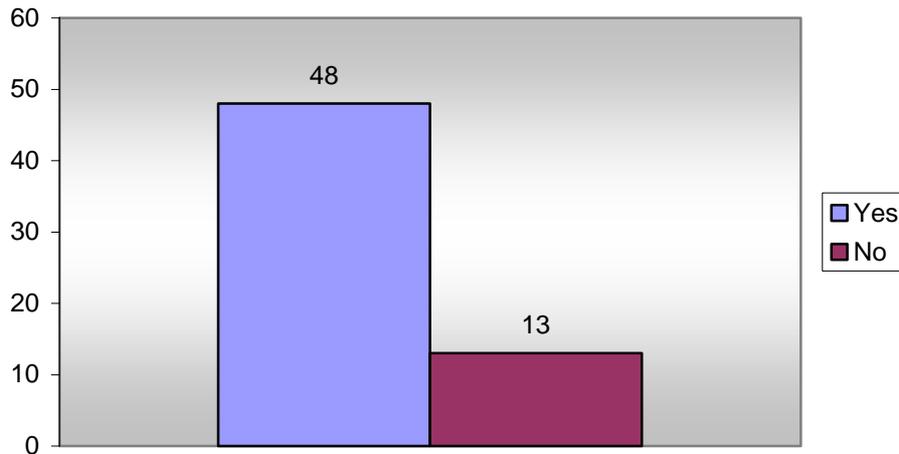


Figure 5 - Number of non-regulatory registrants

This result suggests that the majority of non-regulatory users do register. However, a previous report (HSL/2005/38) contradicts this and finds that most users do not register. The reason for this contradiction is likely to be because users completing the questionnaire may have done so in response to the mail shot (see 2.3), which was only sent to registered users.

3.5 Q4 - DID YOU ENCOUNTER ANY PROBLEMS USING THE SAT SOFTWARE?

The respondents had a choice of selecting either 'Yes' or 'No'. This question could not be left unanswered and the results are shown in figure 6.

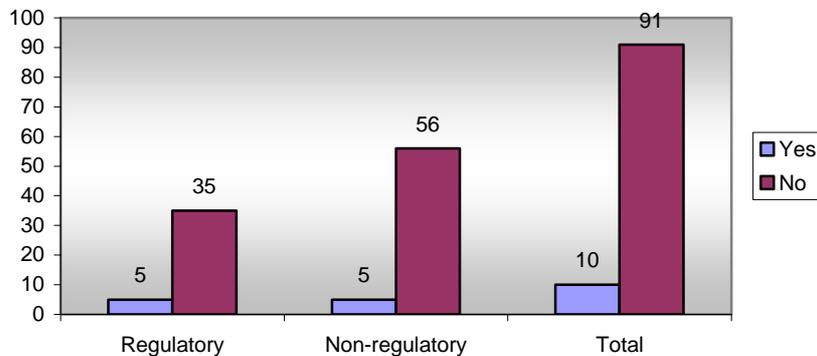


Figure 6 – Problems using the SAT software

The majority of users did not encounter problems using the software although the proportion of those that did is relatively high. However, from the comments in Appendix B, it can be seen that some respondents have used this question to request additions, such as the printing of bar charts or to reiterate problems installing the software. At least one (regulatory) respondent also used this question to highlight problems with the meter. Therefore it is probable that the proportion of users experiencing problems is less than figure 6 indicates.

3.6 Q5.A - I FOUND THE HELPLINE:

The respondents had to select a single choice from 5 available ranging from ‘Very useful’ to ‘Did not use’. This question could not be left unanswered and the results are shown in figure 7.

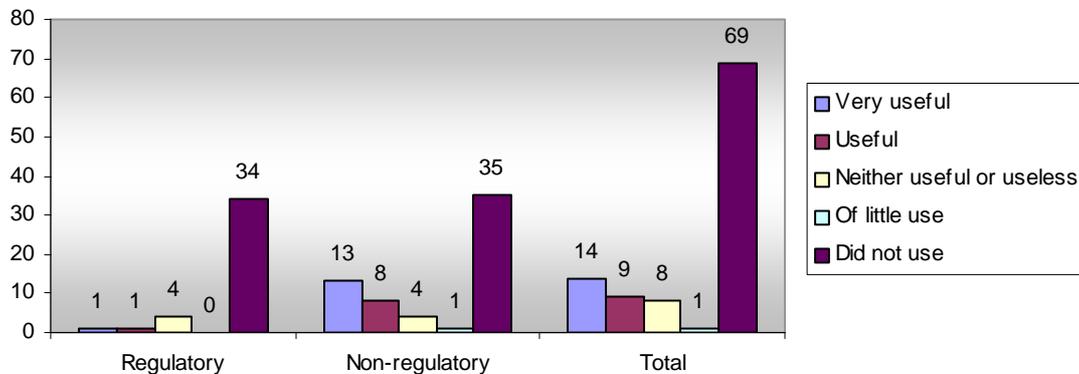


Figure 7 – Usefulness of SAT helpline

The response to this question highlights a difference between regulatory and non-regulatory users. A large majority of regulatory respondents did not use the helpline and of those that did the majority found it ‘Neither useful or useless’.

However, for the Non-regulatory users, a larger proportion of users did use the helpline and of those that did a large majority found the helpline either Very useful or Useful.

3.7 Q5.B - IF YOU RESOLVED PROBLEMS WITHOUT THE HELPLINE, WHAT DID YOU DO?

The respondents answered this question using a text box. Answering this question was optional and the comments are included in appendix C. It can be seen that many respondents solved problems by communications with colleagues. Others read the training material or attended training courses.

3.8 Q6.A - I AM USING THE FOLLOWING METER WITH THE SAT (PLEASE TICK ALL THAT APPLY):

This question was only included in the non-regulatory questionnaire since the regulatory operators are expected to use the Taylor Hobson Surtronic Duo. The respondents had to select a single choice from 5 available. This question could not be left unanswered and the results are shown in figure 8.

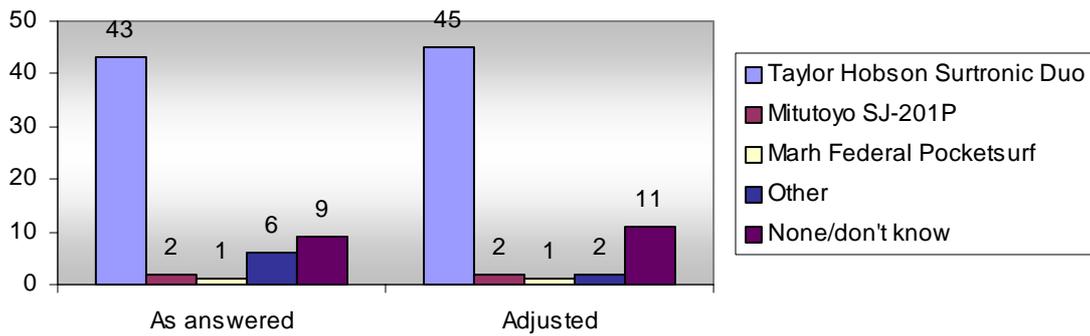


Figure 8 – Meter usage

The results as answered by the respondents are shown on the left hand bar chart in figure 8. The majority of operators used the Taylor Hobson Surtronic Duo, the instrument used by regulatory operators.

Where ‘Other’ was selected, the respondent was asked to enter the actual meter used and the results are included in Appendix D. However, this revealed that 2 of these were actually Surtronic Duos (the term ‘Kenny’ mentioned in the appendix is a nickname that the Surtronic Duo has been christened with). Also some respondents used the ‘Other’ selection if they did not have a meter. The figures have therefore been adjusted to reflect this and are shown in the right hand bar chart group in figure 8. The 2 meters included in the ‘Other’ section were the Surtronic 10 and a Surface tally gauge.

3.9 Q6.B – WITH METER I USED I WAS

This question was only included in the non-regulatory questionnaire since all the regulatory operators use the Taylor Hobson Surtronic Duo. The respondents had to select a single choice from 6 ranging from ‘Very dissatisfied’ to ‘Very satisfied’. This question could not be left unanswered and the results are shown in figure 9.

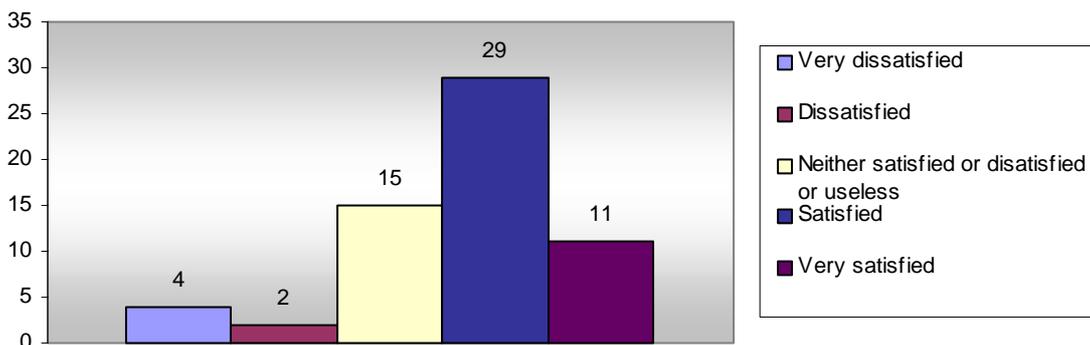


Figure 9 – Meter performance

Most respondents were either very satisfied or satisfied with the meter. The comments regarding the meters are discussed in section 3.10.

3.10 Q6.C - I HAVE THE FOLLOWING COMMENTS ABOUT THE METER I USED

This question was only included in the non-regulatory questionnaire since all the regulatory operators are expected to use the Taylor Hobson Surtronic Duo. The respondents answered this question using a text box. Answering this question was optional and the comments are included in Appendix E.

Several users mentioned that they had problems with the infrared link with the Surtronic Duo. Of the 4 respondents that were very dissatisfied (see above), 2 made no comments as to why this was and 1 made a comment that the ‘Tool performing as expected’ so the ‘Very dissatisfied’ response may have been selected in error.

3.11 Q7.A - I FOUND THE EXPLANATORY MATERIAL IN SAT E.G. FAQs

The respondents had to select a single choice from 6 ranging available from ‘Very useful’ to ‘Did not use’. This question could not be left unanswered and the results are shown in figure 10.

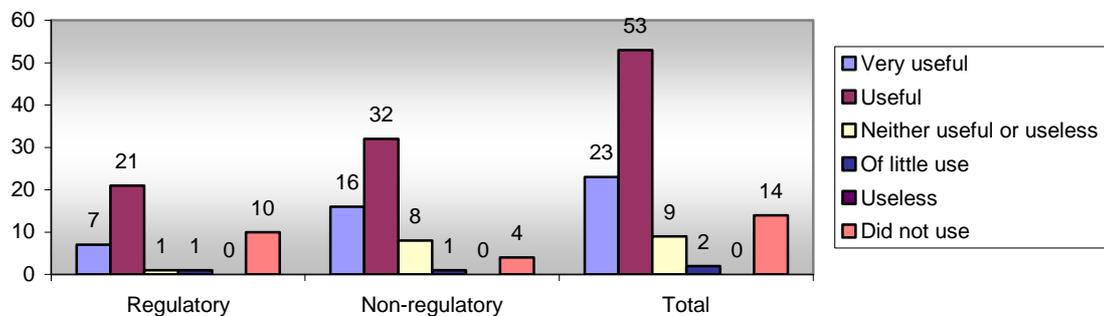


Figure 10 - Usefulness of explanatory material

The majority of respondents found the explanatory material either very useful or useful. The comments are discussed in section 3.12 but of the respondents who gave a lower score, few included comments as to why this was.

3.12 Q7.B - I SUGGEST THE FOLLOWING TO IMPROVE THE EXPLANATORY MATERIAL:

The respondents answered this question using a text box. Answering this question was optional and the comments are included in Appendix F. It can be seen that there is a variety of comments and these will be considered for the next SAT release.

3.13 Q8 - I HAVE USED THE SAT ON THIS NUMBER OF OCCASIONS

The respondents had to select a single choice from 6 available ranging from ‘None’ to ‘>10’. This question could not be left unanswered and the results are shown in figure 11.

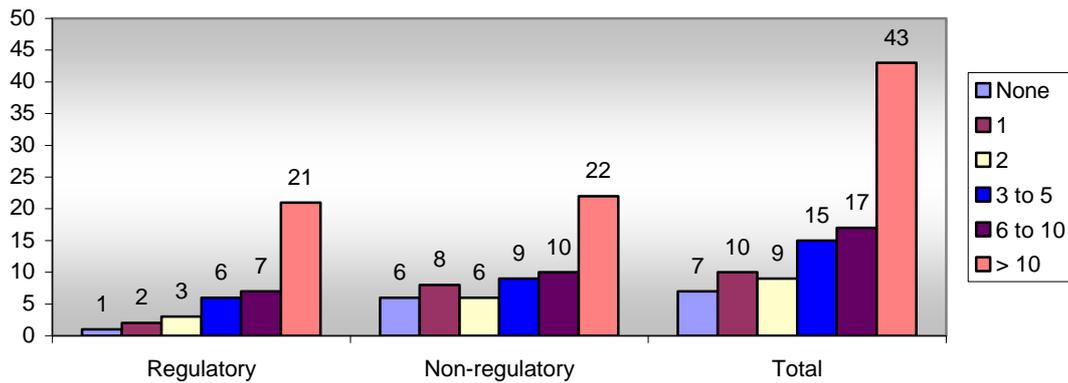


Figure 11 – Number of times respondents have performed an assessment

A significant majority of respondents had used the SAT on more than 10 occasions. However, a total of 7 respondents had not used the SAT at all.

3.14 Q9 - I HAVE PERFORMED SAT ASSESSMENTS

This question was designed to determine whether respondents completed the assessments on site using a laptop computer or used a paper proforma to collect the information that they then entered into an office computer.

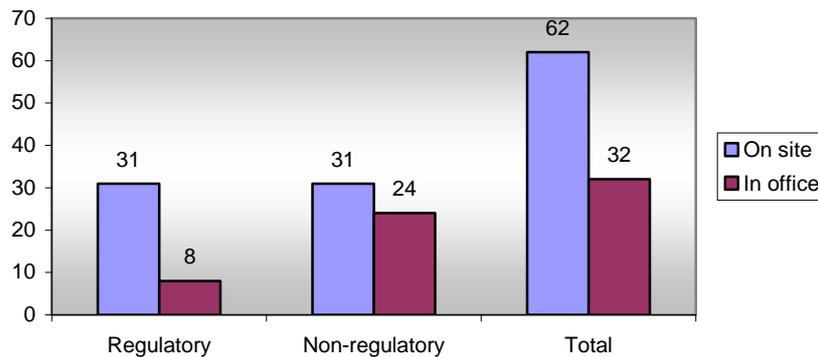


Figure 12 – Where assessments are completed

A small problem was highlighted with this question because respondents could only choose between 'on site' or 'in the office' and could not leave the question unanswered. Therefore the 7 respondents who had performed no assessments (see section 3.13) had to enter a fictitious value, possibly skewing the results. Therefore, the chart above shows the replies with these values removed.

The results from the question highlight a difference between the Regulatory and Non-regulatory users. Although the majority of respondents from both groups perform assessments on site, the majority is significantly less for non-regulatory users. One reason may be that many non-regulatory respondents perform assessments in the location in which they are based and so do not carry a laptop with them. However, regulatory users will normally be visiting many different sites using a laptop PC to demonstrate the slip risk immediately.

3.15 Q10 - GIVE EXAMPLES OF HOW SLIP RISKS HAVE BEEN REDUCED FOLLOWING USE OF THE SAT

The respondents answered this question using a text box. Answering this question was optional and the comments are included in Appendix G. From this it can be seen that both groups of respondents list a variety of examples of how slips have been reduced. However, one common theme is the improvement to cleaning regimes.

3.16 Q11 - HOW USEFUL DID YOU FIND THE SAT?

The respondents had to select a single choice from 5 available ranging from ‘Very useful’ to ‘Did not use’. This question could not be left unanswered and the results are shown in figure 13.

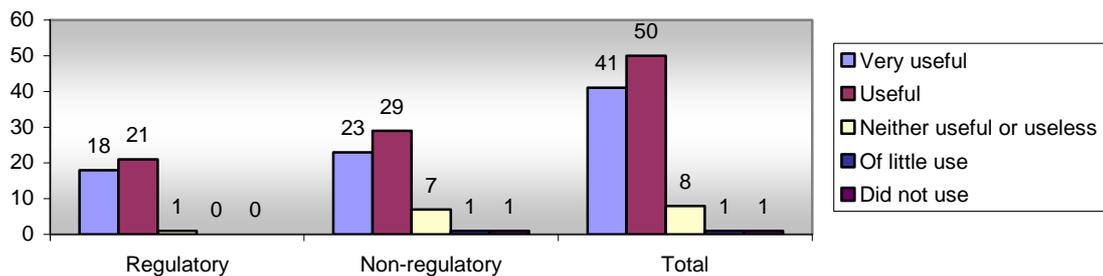


Figure 13 – Usefulness of the SAT

A large majority of respondents from both groups found the SAT either very useful or useful. One non-regulatory respondent found the SAT of little use. Comments included for other questions from this respondent indicate that he/she thought the tool was biased towards industry and is not suited to hospital environments.

3.17 Q12 - I WOULD LIKE TO SEE THE FOLLOWING IMPROVEMENTS: PLEASE STATE

The respondents answered this question using a text box. Answering this question was optional and the comments are included in Appendix H.

Several respondents requested the ability to print the bar chart and it is hoped to include this in the next SAT release. Other suggestions include the ability to select several types of cleaning in a single assessment, improving reports and being able to assess slip risks in sloping areas.

This question also highlighted the fact that some (non-regulatory) respondents do not always distinguish the SAT from the meter e.g. “SAT doesn’t seem to like the cold, it doesn’t always work first time in food factories.”

3.18 Q13 - I FIND SOME TYPES OF ASSESSMENTS PARTICULARLY DIFFICULT

The respondents had a choice of selecting either ‘Yes or ‘No’. This answer could not be left unanswered and the results are shown in figure 14.

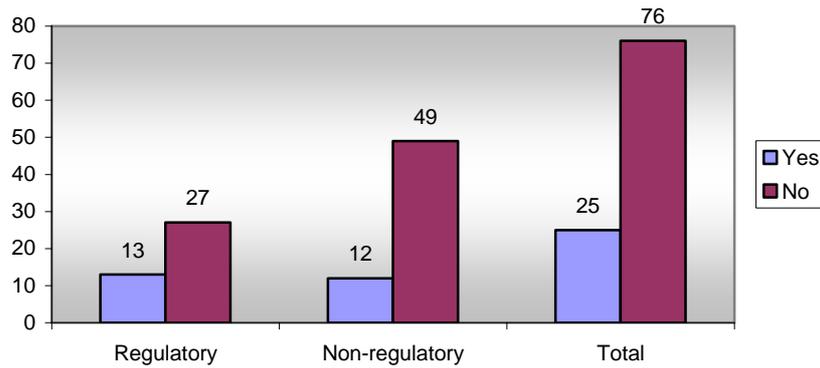


Figure 14 – Respondents who found some assessments difficult

Approximately 25% of all respondents found some types of assessment particularly difficult although this differed between the 2 groups (34% of regulatory compared to 20% of non-regulatory). One reason for this difference may be because of the variety of sites that regulatory users visit.

A full list of comments is included in appendix I but common themes include using on stairs/slopes. Several users also commented that it was difficult on cold days but this is an issue with the meter.

3.19 Q14 - I HAVE USED SAT IN THE FOLLOWING SECTORS (PLEASE TICK ALL THAT APPLY)

The respondents had a choice of sectors that they had perform assessments in and could select any number from 0 to all. The results are shown in figure 15.

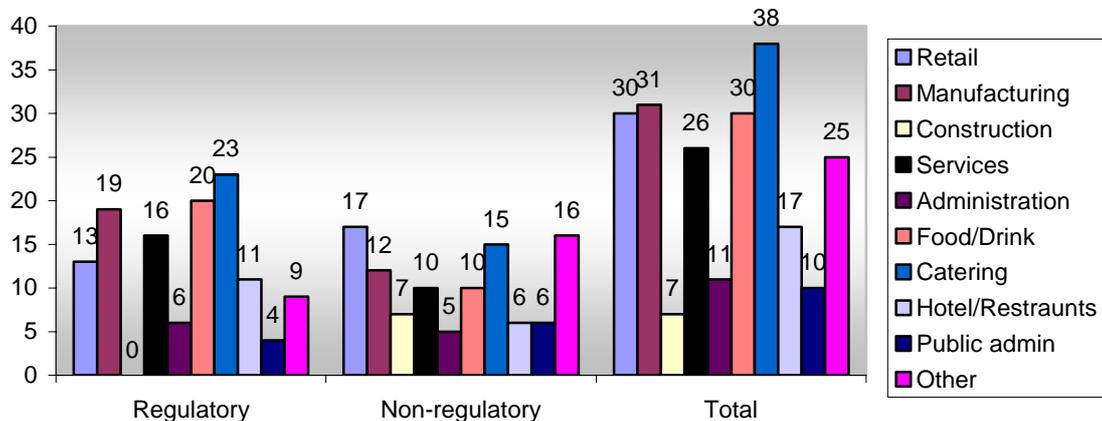


Figure 15 – Sectors in which the SAT was used

From appendix J it can be seen that the SAT was used in a variety of ‘Other’ sectors including healthcare, public transport and leisure.

3.20 Q15 - I WOULD LIKE TO MAKE THE FOLLOWING ADDITIONAL COMMENTS:

The respondents answered this question using a text box. Answering this question was optional and the comments are included in Appendix K. From these it can be seen that many thought the SAT was a useful tool. There were also suggestions about how to improve it (e.g. adding the ability to print bar charts, making it run on a PDA etc) and also highlighting some of the areas where respondents have not been able to use the SAT (e.g. building sites).

4 Conclusions

The questionnaire proved a valuable tool for assessing the usefulness of the SAT and captured several suggestions for improvements. The results will be used to improve the SAT where applicable.

It may be useful to repeat this exercise sometime after the next release of the SAT.

Appendix A

Q2 - Problems encountered downloading software

The comments for all the appendices have been reproduced from the questionnaire database with any obvious spelling mistakes corrected.

Comments from regulatory respondents

- Although I did not personally complete the task, I was told that it had to be completed via the Authority's IT department, as no one is allowed to download any software etc to council pc's. This may only be done by IT, in case of viruses, use of illegal software etc. This did create a delay.
- But I would like to get it in another format as I want to put the software on a laptop and don't know how to as the laptop is not networked and has no Internet access.
- A technical problem out IT section had to resolve - I didn't understand!
- I could not manage to successfully download it. This is probably due to restrictions on loading software imposed by our IT Dept...yet to be confirmed.
- had to try a couple of times before I was successful – I'm not the most IT literate person - but am not a total duffer - and had to flick between the instruction and the download to understand what I ought to be doing.
- It does not state clearly what to do once you have the Zip file, I am not used to using zip files so am not familiar, in the end I had to speak to the Sector and get someone to go through it with me to ensure I could access it.
- It was sometime ago now, so not sure of the detail. Downloaded once successfully and then lost it, possibly when we were upgraded to Windows NT. Failed to download it subsequently. John Worth then gave me a demo CD which I used when visiting the duty holder and left with the duty holder. Have not tried to download it subsequent to this.

Comments from non-regulatory respondents

- Opening up of WinZip file.
- Got a nice man at HSE to send it to me on a disc which solved all the problems
- Confused – don't know how I did it but it works - could do with clearer instructions.
- Had to send for a disc from HSL. But once downloaded, no problems.
- Error message: 'Unable to execute a user code function. This file may be damaged'
- Have to use the internet version only as could not download otherwise

Appendix B

Q4 - Problems encountered using software

Comments from regulatory respondents

- I was a little unsure as to how to interpret the SAT results relative to the stated R values of the flooring product - I thought they contradicted each other. Not a software issue but one of analysis / interpretation or knowledge / training.
- Once I obtained the CD version, no problems encountered.
- I vaguely remember having some difficulty in saving the data/calcs or in retrieving the saved data. I didn't realise that there was a helpline & haven't used it.
- When error messages occur you don't know what they mean. When the battery ran out I could not remove the panel, there is no tool to assist you to do this in the end I had to use one of the blunter knives in the kitchen (health & safety risk) which did get it off but has damaged the casing.
- Some types of contamination, such as small solids (like bearing balls) are not included and are difficult to assess and justify to the employers.

Comments from non-regulatory respondents

- I have no idea what a roughness measuring thing is so I typed in some random
- Ideally I needed to be able to print off the Remote Testing Pattern
- Saving the assessments is not clear-cut and the format should be in MS Word to make the production of reports easier. Also it would be very useful to print the graph with the report page. The graph is very helpful in getting the message across to facilities managers.
- Apart from the FAQ's I have not been able to print off any of the HSE instructions.
- Needed to arrange the installation of WinZip.

Appendix C

Q5 - Resolving problems without the helpline

Comments from regulatory respondents

- E-mailed Steve Wood
- Read the guidance before attempting to use and trial and error.
- Talked to other users or read helpful emails from other users
- Gained no further useful information or guidance from the helpline. Directed to HSL who provided a scientist to assess the situation.
- Attended two training courses at HSL
- I didn't really resolve the issue - I just didn't bother to save the calcs on my computer (just made a paper record)
- Referred to training notes
- Didn't realise there was a helpline, although only had the problems initially so I called the telephone number I had on the CD from the initial version.

Comments from non-regulatory respondents

- Yes, the use of walkways when cleaning is in operation, and the transporting of goods throughout the building. It has also made others aware of the need to be more observant.
- Spoke to a colleague on the S&T programme.
- Typed in random numbers because I was confused. I didn't notice that there was a helpline
- HSE officer at Carlisle ran through program with me
- Found that records could be streamlined better and eventually set up my records to record each individual test but under the same name folder for each tested floor. Problem was that they have to be saved twice in different formats. One format would be best entailing one save operation.
- Check it again

Appendix D

Q6b – Other meters used with the SAT

Comments from non-regulatory respondents

- No meter used
- Still under consideration
- Surface tally gauge (Ginding selected as reference grade)
- Surtronic 10
- Don't have one
- Not yet purchased
- Not sure as HSE officer provided instrument
- Use the HSE inspector's model (Kenny they called it)

Appendix E

Q6c – Comments regarding meter used

Comments from non-regulatory respondents

- Need to inform users that it might not work under fluorescent light.
- Too expensive and not the right tool. Can be done cheaper with a £10 surface gauge
- Small operational issues but service from Taylor Hobson excellent
- Quick and easy to use
- OK but Rz is of limited use, a better parameter would be preferable if it can be measured economically
- I don't have a meter
- Tool performing as expected
- Batteries do not last and are difficult to source
- Could do with a better infra red link
- Overly complex for a limited use, excessive costs and the lack of product lease/hire, showed that the safety product service market, is not responding effectively to HSE led safety improvement initiatives.
- Easy to use, clear instructions for use provided.
- Compact. Easy to use.
- Bit delicate - We have dropped one accidentally!
- If you have to travel by foot, it is easily portable for remote testing. Not ideal for rougher wet outside areas. Not ideal for determining slip resistance in actual wet conditions.
- On occasions the range of readings appears to be erratic and does not follow an expected pattern / trend. When this happens I tend to ignore extreme readings and end up taking several more readings, which is time consuming in order to achieve an improved accuracy band.
- Infra Red communication failed on a unit less than 12 months old.
- Seemed to give error messages in some locations (always the same) as though there might be interference but nothing could be identified.
- In addition it would be useful to have some means of more accurately measuring wet floors.
- Understanding the Meter was fine but there was no information with the meter to indicate what should be done with the readings, e.g. getting on to your WEB site.
- I had sent it back to manufacturer when WAS NOT ABLE TO CALIBRATE IT. It's fine now. I find it easy to use and because it is small and compact, lightweight and easy to carry around suitable for all environments with.
- Simple and easy to use but time consuming in taking sample readings.
- It is a bit temperamental at times showing 'error' when I have been using it the same way on the same surface. When it shows 'error' I'm sure it would be explained away as human error.....
- I am awaiting the Taylor Hobson Surtronic order held up by the Trust's financial position.
- Not used yet.

Appendix F

Q7b – Suggestions for improving explanatory material

Comments from regulatory respondents

- Had recently received training on use of SAT at an HSE/HSL training day, so did not need to refer to FAQ's. Most difficulty was experienced with the use of the Surface Roughness Meter.
- Maybe a reminder on what R values mean would be useful.
- Make it clear whether the parameters are worst-case scenario or as found.
- Better manual for the roughness gauge.
- Get an IT idiot to try out instructions to make sure they make sense to a duffer.
- I still find it difficult to assess the amount of contaminant or the flooring type.

Comments from non-regulatory respondents

- Some of the decisions are quite subjective and in practice I end up guessing at some of the answers. The re-contamination does not always fall into the categories shown for example.
- Key table to indicate low, medium, high ranges.
- I dint need ny ;)
- The font could be a little larger on the results page with subheadings for those people not familiar with the tool.
- I didn't realise the info could be downloaded as a Word Doc for a while and had been saving the notepad version of things, which doesn't really help managers and extended my time explaining issues etc. As you may gather IT and me are not best of friends so if this aspect of things could be made blindingly obvious it would be a great help. Many thanks.
- Not used yet

Appendix G

Q10 – Examples of how the SAT has reduced slip risks

Comments from regulatory respondents

- Companies have modified their cleaning procedures.
- Used following an accident on site and enabled us to encourage an employer to replace the floor. Some times when we have used it we have found that it gave us a low slip risk when it was apparent that it should be significant. It doesn't allow for contamination such as polish or dust to be built into the system and the only way we could get a significant slipping risk was if we put that the floor was subject to water contamination which wasn't exactly the case. Following these obscure results we sought the help of HSL to undertake pendulum analysis which was very helpful!
- Identified areas within a premises where cleaning procedures needed improving.
- Premises convinced to replace or treat floors to improve slip resistance. Very convincing for using supplementary matting to remove water from shoes etc at entrances to prevent/reduce slip accidents where floors have low slip resistance.
- To raise awareness with proprietors and prove that there is a real problem. This has encouraged them to improve cleaning methods, reduce the amount of spillages, better maintenance of equipment.
- I investigated a slip accident where an employee slipped on an outside path which was uneven and had an algal film on it which resulted in the path becoming very slippery in wet weather. The results of the SAT showed how different paving and regular cleaning could reduce the risk.
- We made recommendations to the business installing the floor and they installed a good slip resistant flooring product.
- Changes to cleaning procedures.
- Encouraged duty holders to manage risks more flexibly and got away from simply replacing the surface as a control. Emphasised cleaning as an important risk control.
- 1. Change of cleaning regime in retail premises
 2. Replacement surface in walkway outside offices following a slip incident
 3. Additional information provided to visitors to a shopping centre in wet weather
- In a number of cases it was evident that the cleaning regime was a problem and specialist advice on this has helped to resolve the problem. In one case where a number of different types of flooring were present it was evident that some were better for that type of environment than others and the company are now more aware of considering the slip resistant properties of flooring in their purchasing.
- Issues relating to incorrect cleaning identified.
- The impact of the various solutions are presented in an easy to view format, though many employers feel it may be just computer speak which does not relate to the real world. However, when explained in terms of "reasonably practicable" and reduction of risk by the solutions shown, a good impact appears to be made in that solutions are agreed and carried out (as subsequent visits have shown, as our authority has used the tool for more than 2 years now).
- Suggested PPE i.e. footwear and changing/modifying cleaning regimes.
- Presentations given to Network Rail at Paddington Station and to Arriva Trains Wales who are feeding in the results to their assessments for overall safety at their stations in Wales.
- Gave company a tool to quantify the level of risk and justify appropriate remedial actions such as increased cleaning frequency.
- Painted concrete stairs were identified as high slip risk when wet. Surface painted with slip resistant coating.

- 1 Worked in a cake shop/cafe with LA EHO - showing the manager the numbers lead to them replacing the floor without the need for an enforcement notice - the results were very clear when compared to a 'non-slip' floor in the same premises. 2 The graph is very useful in showing an occupier that housekeeping can reduce a risk and gives a clear visual aid to help persuade occupiers of the need for change. 3 I have helped an occupier make a decision on type of flooring to be used in a new-build production area so risk eliminated before manufacturing started.
- Lobby areas carpeted.
- Most significant benefit is adding objective scientific weight to my own informed opinion re factors, problems & possible solutions.
- Emphasis placed on factors that can be used to reduce SAT score - e.g. improved cleaning regime etc.
- Painted walkway found to be more slippery than surrounding concrete floor - company to repaint with anti slip paint and check other depots.
- NB Q9 used it both ways. Data used to make case for improvements particularly regarding footwear. Also used to prioritise action when funds available. Also for changing cleaning regime.
- I have performed SAT assessments both electronically on site AND using the paper proforma (but Q9 won't let me pick both, so I've opted for electronically, as I think I used it more this way). A college that I visited have taken the decision to replace a large area of flooring with some new (better slip resistant) material. (HSL kindly carried out some testing of potential samples of flooring to aid their choice).
- Improved cleaning regimes Control of contamination
- Being able to demonstrate slipperiness makes it far easier to get across the risk to a dutyholder and they are more likely to do something about it. I have used the sat to assist in the issuing of IN's, replacement flooring, modification etc.
- Introduction of footwear control and volunteering to take part in HSL footwear trials.
- Modification of cleaning regimes / methods.
- Elimination of sources of contamination - Introduction of mats to eliminate
- Duty holders have altered cleaning regimes, methods of cleaning and have applied slip resistant coatings to flooring and stairs after seeing through SAT how risk can be reduced.
- Floor types and cleaning regimes have been changed in numerous sites.
- I have no examples at this stage. But duty holders were very impressed with the SAT and I found it a very powerful tool for getting the message across.
- Clients tend to get hung up on one issue, such as footwear, the right footwear would solve everything. The tool makes them aware of the other slip elements of the potential model and because it is a computer programme, they take the advice wholeheartedly.
- Much more persuasive than a person.
- The use of the on site assessment helped justify the use of a dry cleaning method on
- An epoxy type of floor, as opposed to wet and allowed to dry
- Demonstrations to dutyholders
- Improved cleaning regimes. Reduction in contamination.
- My work has mainly been carried out in NHS Trusts/Primary Care Trusts and we have fed back the results to key people such as Senior Managers/H&S Managers/Cleaning Managers, etc who have some control over floor maintenance/ordering/cleaning. We have asked the Trusts to analyse the results and identify their priority areas and draw up an action plan as to how they intend to reduce slips and trips. One Trust have reviewed their matting and are looking at increasing the entrance matting at the main entrances to the hospital. They are also reviewing storage of some trolleys which

at the moment are kept outside and are exposed to

Comments from non-regulatory respondents

- Walkways especially hard surface walkways, baths, shower rooms, kitchen floors public wc's
- Cleaning regimes have been altered the use of different chemicals, increased cleaning. Changes have been made to tile specification for future development projects dependant on the slip risk.
- Cleaning regimes were changed, and in certain cases entire areas of floors replaced.
- Cleaning chemicals changed etc.
- Awareness of cleaning staff of risk - signing always used
- Using SAT to identify those areas of floors in Underground stations which are likely to present a high or medium slip risk. This information passed to design team to assist in selection of new materials with higher SRV in problem areas, and to highlight possible failures in cleaning regime
- Used to select new floor material by comparison with those of proven low slip risk.
- Readily accepted by all interested parties on measures to reduce risk such as dust
- Tube Lines are presently assessing slip risk on all floorings at 25 London Underground Stations that are either programmed for refurbishment or modernisation. The risk factor will determine the action to be taken.
- No reduction made in slips, trips and falls currently.
- In a restaurant situation, the bar charts did highlight the importance of the surface roughness of the tiled floor and the need to increase the surface roughness by etching for instance
- Allowed prioritisation of activities before considering footwear
- Had the floor coving changed
- Considered dry mopping after wet mopping.
- Better entrance barrier matting & improved cleaning regime
- I cleared up the beans I had spilled
- One area that came out as very high, we replaced the floor earlier than planned due to slips. To date no record of slips have occurred, but this in turn raised issues with cleaning the new flooring to infection control standards and possible back problems from using the old cleaning equipment on the new rougher flooring.
- Acid etching and/or slip resistant paints have been used on external concrete steps
- The results showed minor risk. However extra handrails installs, full industrial clean done of area.
- Using them for forensic engineering inspections
- We have changed our cleaning regime and introduced a monitoring system during busy times.
- There has been a dramatic improvement in the number of accidents in some particular areas - Catering areas. Cleaning schedules have been altered in two work areas, after SAT assessments showed that floor cleaning was not fully synchronised with work activities.
- We identified one area using the tool which was a painted wooden surface, this has been altered after looking at the risk rating and has been changed to a profiled floor.
- Also sat tool has enabled us to monitor some wear on a 2 year old floor surface walkway, the risk rating is in the low category but tool will enable us to monitor and take action as necessary
- Altering floor surface - removing varnish, returning to natural wood. Changing method of cleaning floor surface.

- Using the meter & the SAT programme we have obtained "official" results to aid us in having action taken on high risk areas e.g. Floor mats used in entrances, anti-slip coating applied to baths, confirmation that 'Altro' flooring in kitchens is being correctly cleaned.
- After the assessment the staffs footwear was upgraded
- Have had walkway with the poorest score due to grease problem jet sprayed.
- We have over 5 million passengers per year travelling across our 6 Ferry Terminals. We had already monitored and changed some surfaces prior to the purchase so there has been no discernable drop. But we are now confident that incident areas are low risk, and of the cleaning and maintenance requirements. The great advantage is that if people claim citing the floor was the cause (normally kitten or high heels wearers with low grip soles sometimes towing wheeled baggage), we can prove that the floor surfaces are SAT tested low risk.
- Surface treatment; changes to the cleaning regime, changes to frequency of cleaning, improved barrier matting
- Having assessed areas of risk, there have been improved cleaning regimes and systems to reduce the risk of slips. Particularly during the drying period after floors have been mopped or buffed. Other improvements were fore and aft - showing how by changing cleaning methods and applying spill controls that the risk rating came down from medium to low risk.
- Demonstrated to management via SAT report the need to change use of area, Report proved useful in the decision to relocate employees from an external building to an internal environment.
- Change in cleaning regimes have been implemented, including better maintenance of equipment.
- I am still building up a record of the Centre to assess the overall picture.
- Where we have a new build or a floor refurbishment we give advice on types of flooring to use where accidents have occurred particularly slips, in refreshment areas closer monitoring of the cleaning process and changes have been made.
- Providing evidence to cleaning contractor of problems due to frequencies and substances used on different types of floor
- Used to advise PFI partners regarding the risks inherent in specification of certain products for certain areas-
- Replacement flooring; local education; placed on the relevant risk assessment and Directorate risk register.
- Enlarged matting at entrances
Generates discussion at H&S Committees
Provides review of cleaning programme and reinforcement of cleaning up spillages promptly
- Cannot give good example in absence of measuring tool but risks have been reduced by rescheduling cleaning activity and ensuring better supervision.
- Not used yet

Appendix H

Q12 – Suggestions for improvements

Comments from regulatory respondents

- It was useful sometimes and can only be used as a tool, it is a little frustrating when it doesn't support your opinion, especially in circumstances where that has been accidents and there is an obvious problem and the system didn't recognise this because of the limited info that it enabled us to put in.
- It would be useful to print out an assessment including the graphics portion in the end screens.
- More relevance to catering situations, as this is where many LA enforced slip problems are likely to occur.
- Reference guide on R values and availability on disc for installation onto laptops
- The ability to use the tool for enforcement without resorting to the traditional (HSL) pendulum meter would be an obvious benefit. Otherwise, a very good piece of equipment.
- Make the bar chart printable. Examples are less relevant for dry/dust contaminants
- Better descriptions of contaminant amount.
- Can it fit on a palmtop/PDA? These are in widespread use by LA inspectors.
- 'Assistance' to make identifying exact floor type easier / correct
- Batteries - availability improved
- More helpful hints - e.g. the need to protect the sensor on the top from bright light sources as this sometimes gives error messages. (I learnt this by phoning HSL whilst I was out on a site trying to use it)
- SAT doesn't seem to like the cold, it doesn't always work first time in food factories.
- To be able to Tab between the reading input boxes to make inputting quicker. On occasions dutyholders have used more than one cleaning method but it is not possible to select more than one method.
- Printable data could be greatly improved to make it more visually readable - such as use of simple graphs and/or bar charts rather than text. It would also help if the 'actual' situation could be overlaid with different data so that improvements and greater failings to cleaning types, floor types, footwear etc. can easily be
- Be able to enter more than one cleaning method and/or perhaps time of day. E.g. deep cleans are undertaken at end of day in food establishment but wet mopping during shift.
- Print out graph.
- Types of floors and types of contamination improved
- I would like to be able to print out the graphs to show the importance of the different factors because sometimes seeing it in a picture format can illustrate the importance of each factor as oppose to simply looking at a figure.

Comments from non-regulatory respondents

- I believe more types of hard surfaces are required to be added i.e. baths/showers/wc's
- People movement in particular where no work is involved and the movement is
- The choice of items to select is very rigid and does not always apply to certain areas. This choice needs to be extended
- Cleaning. can only select one type of cleaning, most people use more than one system during the day. Cleaning section needs improving because it makes little difference to the outcome of the

assessment.

- Can you print off the graph at the end?
- Some of the questions are difficult to answer particularly with regard to re-contamination circumstances especially where contamination is infrequent but significant.
- Including an option to consider the implication of slopes to the floors/paving - possibly with a series of options relating to the degree of slope from horizontal up to (for example) a 1:10 slope. On many floors there are slight inclines or ramps and these do potentially significantly increase the risks.
- Having a specific option for an external assessment where the type/degree of contamination and cleaning effectiveness/frequency is mainly rainwater (that then naturally dries/drains).
- Better pictures of the stuff I might've spilled. Is that last picture of someone being sick or what?
- Amend cleaning regularity to include cleaning every two/three days
- Updates to reflect a non-industrial environment.
- I believe details such as type of cleaning materials would be useful as we found that different solutions gave varying readings, like wise the way it was applied. We introduced a laminate template for reference whilst taking readings and this gave a more accurate system for repeat readings whilst testing the different cleaning regimes through out the test period of a month.
- Free text on date and time of assessment.
- Ability to delete records from saved file
- The whole thing rests on the use of the meter which we don't have are not looking to buy. If there was another way of establishing the floor surface reading it would be more often assessed
- I would very much like to be able to amend mistakes
- It would be very like to see an improvement in the reports so if you have say 6 results for different floor surfaces in the same building you can produce a single report of the various results
- To be able to print the Paper Proforma Test Pattern Diagram for remote testing.
- Hand wash and boot wash should be separated with different scores.
- Provision for weekly cleaning should be included.
- The graph should be printable with the report - I had to use Print Screen then crop.
- Changes to the save option to allow the document to be saved in MS Word direct to my files.
- Initially the graph was a little confusing to some, with low readings on the meter being displayed as a high reading on the graph, however I felt this was not a problem.
- Hard to say?!!
- Make the report offered fit better into word format
- Would be useful if the SAT could be less specific to cater for the large numbers of variations encountered in heavily used public areas. e.g. no control of shoes, many differing conditions, dusty, dry, wet, spills and contaminants.
- I would like clarification on the "How to take roughness measurements". I do follow the procedure as per the site instructions but am about to embark on a whole ward area including bays with beds etc. Would this be for each bay or just generally the whole ward? I'm assuming the first, as I'd feel more comfy with that, but clarification on the site would be helpful
- The section on floor cleaning type does not cover certain cleaning frequencies. It offers a choice of once a day or at regular intervals, which is defined as several times a day. In healthcare floors are often cleaned to a planned programme of twice or three times a day.

Appendix I

Q15 – Assessments that are particularly difficult

Comments from regulatory respondents

- On cold days, Macro rough floors, Under bright fluorescent tubes
- I had a problem with this one assessment but more use will resolve that as I get more familiar with it
- Where site conditions change a lot - which set of parameters to use
- Uneven or vibrating floor surfaces.
- Timber surfaces are difficult to clean prior to the test specialist anti slip flooring gives a wide variation in readings.
- Trying to assess floors made slippery by dry contaminants.
- Wet, barefoot conditions.
- Seems to be affected by temperature or other electronic devices e.g. in cold store area or in office environment
- I still find it difficult to determine what type of material a floor (& shoes soles) are made of. The photos help - but could be better resolution or better lit (lit from side) to show the patterns/detail.
- Tread of stairs
- If you are in a slippy environment e.g.: due to oil, it can be very difficult to find a clean section of floor to measure. The majority of slips occur on sloped levels but I have been informed it is not meant to be used on sloped areas which seems a bit pointless.
- Grease contamination from chicken fat at Tulip Ltd, as it affected the surface itself
- The tool has limitations in that many textured floors do not fit
- Stairs.

Comments from non-regulatory respondents

- As above
- Assessments on patterned floors, getting onto the profile or onto the radius of nosings and so on
- Only difficult where indications are contradictory, and a more extensive investigation is needed, but SAT indicates when this is the case.
- Where there is a slight slope on the floor - deciding how much of an impact that this is likely to have.
- External assessments where contamination is mainly that of rainwater and where the only "cleaning" is that of the contamination (mainly water from rainfall) naturally drying or draining - it is not always easy to decide how to enter such factors as cleaning frequencies, levels of contamination etc. Varying these does affect the assessment outcome.
- I found the Taylor Hobson Surtronic Duo does not work in cold weather conditions
- Most of the question in the SAT refer to industry. In a hospital environment where slips are a major issue. The flooring is cleaned daily and the level of contamination is always low. In addition, when inspecting flooring i have never found any evidence of spillages on the floor. All this acts to lower the risk and very rarely does it come out higher than Minor. To combat this I have had to use discretion and put the level of contamination and types of spillages at what I think they could be if an event happened. This would be hard to explain to any HSE inspector who came to view an accident.
- Knowledge of different types/classifications of floor materials

- On sloping rough non-slip surfaces up to an angle of 20 degrees. (Passenger incidents are isolated but can still occur, these high use public ramped gangways are used for ferry access/egress in all weathers and states of the tidal range)
- Some floor surfaces cannot be assessed using the Surtronic duo.
- Ambiguity dependant upon what put into tool giving very different results.
- Not used yet

Appendix J

Q14 - Other sectors that SAT is used in

Comments from regulatory respondents

- Car Repair Workshops & Showrooms
- Distribution
- Hospitals
- Leisure
- Leisure and recreation
- Particularly Trusts & schools
- Practice
- Railway industry - mostly stations
- Swimming pools
- Timber deck of HGV trailer
- Warehouse - storage and distribution

Comments from non-regulatory respondents

- Airport; Education
- Commercial areas in MRT stations
- Contract Cleaning Office Buildings
- Healthcare
- Healthcare – Hospital
- Healthcare sector
- Hospital Environment
- Hospital wards and general environment
- Hospitals
- I used the SAT in my office where we fix computers and do boring paperwork all
- London Underground station flooring
- London Underground station floors
- Mainly for training of LA enforcement officers.
- NHS
- NHS Trust
- Not use yet
- On the Parliamentary Estate which includes food and drink, catering egress access to buildings and floors in general
- Printing newspapers
- Public Transport
- Social Housing
- Sport
- Steam rooms
- Swimming Pool Area
- University
- Warehouse/distribution

Appendix K

Q15 – Additional comments

Comments from regulatory respondents

- Very useful tool. Companies find it useful to check the raw data we supply (as well as check our analysis). And the ability to change options leads the duty holder to make their own decisions about improvements, etc.
- A very useful tool to demonstrate how different factors can affect the potential slip risk of traffic routes - a more subjective result rather than just an officer giving an opinion which a dutyholder may not accept.
- A request was made from one duty holder for the section on cleaning to take account of the fact that he used a degreaser-type floor cleaning product. He felt that this was a significant factor, which the software did not take proper account of. (The floor remained very slippery, even with the use of this product!).
- As an HSL Field Scientist my work has shifted somewhat towards use of the Pendulum, precluding the use of SAT. Most EHO's / HSE inspectors requesting Pendulum work are due to their own SAT Assessments.
- I have practiced using the Duo but have not had the chance to use it on site yet.
- Surtronic Duo needs to be more robust/reliable
- 'Kenny' seems a bit temperamental at times but generally achieves good results. The software is very useful to illustrate control measures especially where a management team is present.
- I have occasionally found that the range of results is quite large (e.g. values of say 10 - 40) for the same floor (usually from roughly the same area). This always makes me wonder whether the final answer is actually very meaningful. Is there any guidance on what is a reasonable range & what to do if you are outside the range.
- It would be helpful to be able to print the graph as well as the report bit at the end, as a picture often has more impact than words and numbers alone.
- My experience of using the SAT was that it was a very useful tool and is highly effective as a means of generating interest from the dutyholder.
- For the first time, we have been able to justify on site, without the need for a specialist with complicated equipment, the need for better controls, choice of floor surfaces and cleaning regimes. This makes HSE inspectors look professional in their approach to risks.

Comments from non-regulatory respondents

- I cannot use this program on building sites, where slips and trips occur frequently. Measuring the unevenness of a footpath made of gravel is not possible with this instrument. Please keep me informed when you have suggestions for measuring the walkability of building sites.
- When the EHO came out to do floor slips they only took one slip reading, however on your information it recommends that you take 10 different readings in different positions around the same area.
- Forget the expensive tool and buy a simple surface gauge. The tool allows for judgement and this simple gauge makes it very simple
- I find a widespread misunderstanding of the role of the SAT, for instance that it takes the place of using the pendulum tester

- We need more tools of this nature to assist in risk assessments, maybe the MAC tool could be developed electronically
- Thanks for developing such a tool
- A useful broad-brush indicative tool for general use by non-specialists.
- This questionnaire is very nice, but I think it has some issues when I use Firefox. When I tried to type in the 'other' box I click on the typing area but the cursor disappears. I had to Tab around for ages to get there the hard way.
- I would like the sat to make some recommendations when the results are produced
- Can the software be downloaded onto a PDA, if not is this something that is likely to be developed, if when?
- Thanks
- A good tool, but biased towards industry. Using in a hospital environment means that results are all coming out as low.
- If the program accessibility was made easier that would help but apart from that it is a good little program.
- The save procedure only in one format and only once (Most easily readable in hard copy) RTF Format
- Very useful aid to improve awareness, assists with data collection, and provide guidelines. To help identify hazards and reduce risks.
- After a satisfactory trial our Company purchased 6 Surtronic Duos & all our Centres are actively encouraged to use them with the SAT programme
- Nothing to add just wish the meters were cheaper
- Tools of this type are very useful for safety practitioners. I like the tools that the HSE & HSL have put forward in the last couple of years.
- Great to send to buildings and maintenance mangers to highlight slip issues.
- A wonderful pro-active way to reduce accidents in specific locations i.e. entrances,
- Kitchens restaurants etc. On new projects where advice can be given before a poor floor is laid.
- Overall a very useful tool in developing appropriate evidence based risk assessments
- Thank you very much for producing this toll. I think it is marvellous and is assisting improvements throughout this Trust.