

FITNET

European Fitness-for-service Network

Technical Report

Survey of Current Application and Future Requirements for European Fitness-for- Service Technology

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1 INTRODUCTION

The present report was compiled as a Deliverable to the European Fitness-for service Network - FITNET. This Thematic Network involves over 40 organisations all with recognised expertise in this area, drawn from 16 European countries, under the coordination of GKSS. It was launched in February 2002 to promote the development of a European Fitness-For-Service (FFS) Procedure for assessing the structural integrity of metallic structures transmitting loads. In particular, it covers techniques for dealing with known or postulated defects and considers the failure modes of fatigue, fracture, creep and environmental assisted cracking. The network harnesses recent technological advances from EC-funded projects, national programmes and in-kind contributions. Working groups addressing particular failure modes, such as corrosion, fracture, fatigue and creep, have been established to review existing standards, create a database of validation tests, and produce consensus recommendations for a European structural integrity assessment procedure. Further information on FITNET can be found on the network website - www.eurofitnet.org.

The FITNET network consists of a matrix of Working Groups and Work Packages; the latter cover all failure modes, and address a particular stage of the network, e.g. state of the art review, standardisation, dissemination and education. The present report is part of the list of deliverables under Work Package 2, dealing with the review of the state-of-the-art in FFS. It is an analysis report of the results of a comprehensive survey i.e. questionnaire, targeted to a range of organisations. This survey was designed to collect as much information as possible concerning industrial practices related to the application of FFS technologies. The aim is to provide a picture of the current status of fitness-for service technology and to evaluate the priorities for the development of a European fitness-for-service code. The results are expected to assist the FITNET group to better direct the programme of the thematic network and to formulate new R&D actions. The survey was co-ordinated by the European Commission's Joint Research Centre, Institute for Energy (leader of the FITNET Work Package 2).

The following section of this report describes the design of the survey, its distribution and the analysis of the replies received.

2 DESIGN OF THE SURVEY

The programme of Work Package 2 called for a survey of Fitness-for Service technologies users, ranging from industrialists to researchers in order to collect as much information as possible concerning current practices and future research requirements related to FFS procedures.

The questionnaire, entitled “Current Application and Future Requirements for European Fitness-for Service (FFS) Technology” was divided into the following sections:

Section 1: Organisation type

giving information about the respondent profile.

Section 2: Use of FFS technology

asking when, by whom and how are the FFS assessments undertaken and whether there is a need for a European FFS Code. Also enquiring about the main issues in performing FFS assessments – difficulties, most relevant types of damage assessment, software tools available.

Section 3: Training needs

ranking of training needs, requirements, and training options; also reactions to the question about a possible professional qualification for competence in the application of FFS technology.

Section 4: Current R&D Priorities and Support tools

for collection of information concerning current and future R&D priorities in FFS technologies and support tools needed for promoting FFS methods.

Section 5: Final comments

for adding any comments on issues raised but not exhaustively covered by the questionnaire.

The overall document, as finalised at the beginning of October 2002, is included in the Appendix of the current report. It was also translated into French, German and Italian by JRC and into Hungarian by Dr. Lenkeyné, Bay Zoltán Foundation for Applied Research, Hungary. The survey was made in the name of the JRC who also collected the replies and guaranteed the anonymity of the respondents.

3 DISTRIBUTION OF THE SURVEY

The questionnaire has been distributed in two main ways.

- a) The JRC sent as an attachment to an electronic message a copy to its mailing lists in the week of October 14, 2002. The actual mailing lists used apart from personal contacts were: the FITNET members list (44 questionnaires distributed), the European Pressure Equipment Research Council list (EPERC) and the Plant Life Assessment Network (PLAN) list (339 questionnaires distributed). The deadline for the response was originally set to 31st October 2002 and was then extended to 15th of November 2002. To increase the response rate the survey also appeared in the FITNET web site and a second extension to the deadline was given. The final date for receiving replies was set to be November 30, 2002.
- b) The Consortium members were also encouraged to distribute copies at Company and if possible national level, using their own mailing lists (avoiding, naturally, where possible overlapping with other mailing lists). A number of copies also reached the European Structural Integrity Society (ESIS) German members via Prof. K.-H. Schwalbe, GKSS, Germany.

Overall it is estimated that about 500 organisations received the document. 68 replied, corresponding to an overall reply rate of 14%. The completed forms were collated at the JRC for analysis.

The country-by-country breakdown of replies is shown in Fig. 1. A fairly balanced response was received from large countries like the UK and Germany whereas the number of completed forms from the many available French and Italian firms was rather disappointing even though a translation of the survey in these languages was also provided. On the other hand, the Hungarian translation yielded 11% of total replies matching the good number of responses from the Netherlands.

The issue of the language used in the questionnaire was initially judged to be of a concern to a certain extent. However, some FITNET members were of the opinion that most of the engineers receiving the form would have a good enough passive knowledge in English to reply and translations may not necessarily bring an increased number of replies. That was also confirmed by the received questionnaires, with the exception of the Hungarian translation that encouraged a rather good response.

Responses per country

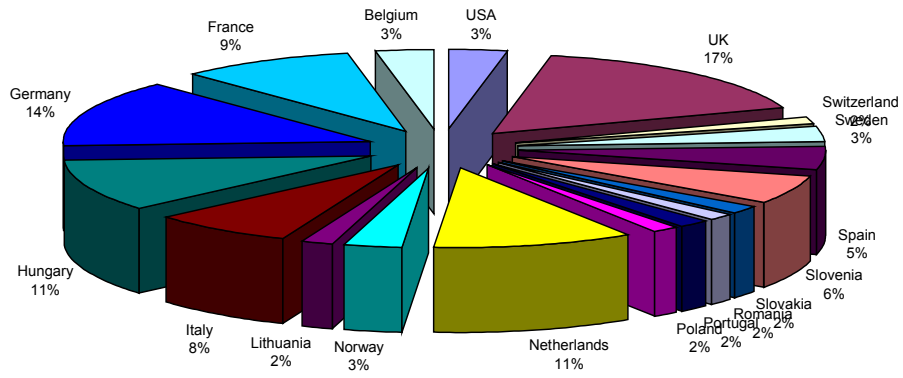


Fig. 1 – Country-by-country breakdown of the response to the survey.

4 ANALYSIS OF THE REPLIES

4.1 Section 1: Respondent profile – Organisation Type

The aim of this section was to provide information on organisations performing Fitness-for-Service assessments. The results indicated that replies had been received from a broad spectrum of the sector and covered the full range of applications foreseen.

4.1.1 Question 1: Organisation details (size and type)

Here respondents were asked to indicate whether their organisation is multinational, a FITNET member and also give information about its size, with three options:

- less than 50 staff (small)
- 50 to 500 staff (medium)
- more than 500 in total staff (large)

As shown in Fig. 2, the breakdown shows that medium-sized companies contributed by a no means negligible 26% share, small organisations were only representing 13% of the replies received, whereas 61% of the respondents could be classified as large Companies with more than 500 in total staff members. It is noted that 32% of the replies were from FITNET members.

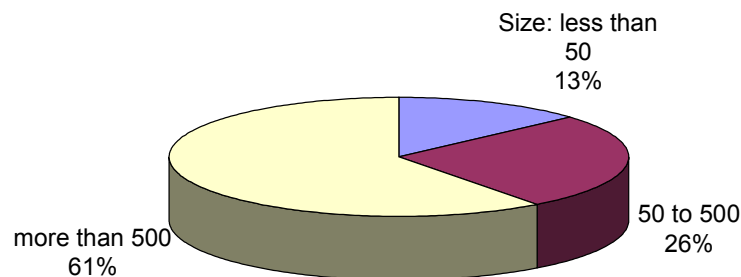


Fig. 2 – Breakdown of the replies in terms of size of organisation (in terms of staff numbers).

4.1.2 Question 2: Role of Organisation

This question requested to identify the actual role of the respondent's organisation in general terms, from the following selection of options:

- | | |
|--------------------------|--------------------------|
| - Component Manufacturer | - End-User |
| - Industrial R&D | - Academic |
| - Safety Authority | - Engineering Services |
| - Research Institute | - Other (please specify) |

Fig. 3 shows the breakdown of replies received with an equally strong response amounting to a total of 48% coming from the Engineering Service Companies /Organisations and Research Institutes. The remaining 52% of the replies were split between the Industrial Research, End-Users and the Academic Organisations, while few replies corresponding to 5-6% came from the Safety Authorities and the Component Manufacturers sectors. There were seven entries in the “other” section. All of them were though covering issues already included in the ‘generic’ areas listed in the questionnaire and a great part of them were also discussed under Question 3. That is why they were not considered as new entries.

Overall, Fig. 3 shows that, as planned, the survey reached quite a range of organisations.

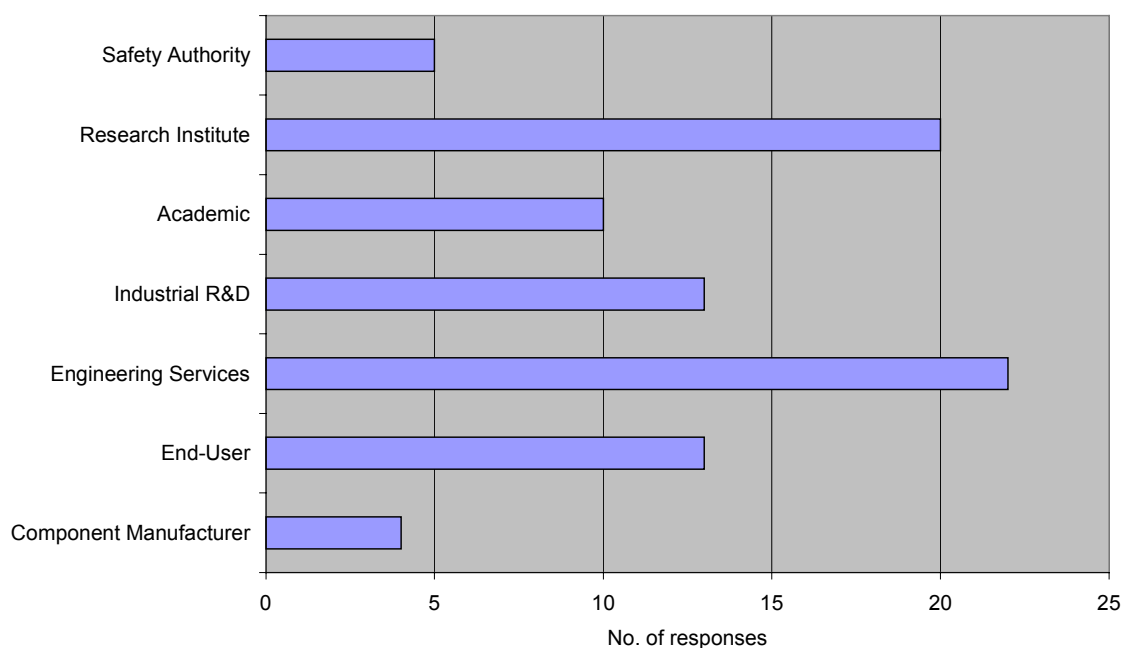


Fig. 3 – Breakdown of the roles of the organisations that replied to the survey.

4.1.3 Question 3: Sectors or fields of activity

In this question the respondents were asked to identify a field (or fields) of activity where their organisation is involved in, with the available options being:

- Power Generation
- Aerospace
- Surface Transport
- Petrochemical
- Other (please specify)
- Pipelines
- Gas Supplier
- Process Industry
- Offshore

Fig. 4a shows the breakdown of replies. Please note that respondents could indicate more than one field of activity and as a result of this, the total of percentages came up to higher than 100.

However the results were then ‘normalised’ by the total number of responses in order to present them in terms of percentages as seen in Fig 4b. Power generation, Petrochemical and Pipelines are predominant. The “other” section received a quite substantial number of diverse entries, corresponding to a total of 12%, including: Materials Science and Engineering, Industrial R&D Department, Nuclear research, Welding of steel structures centre, Civil and Industrial, Research Consultancy, Project Management and Sub-sea Construction, Structural Engineering, ND Control, Oil supplier, University, Non-profit research organisation, Certification body.

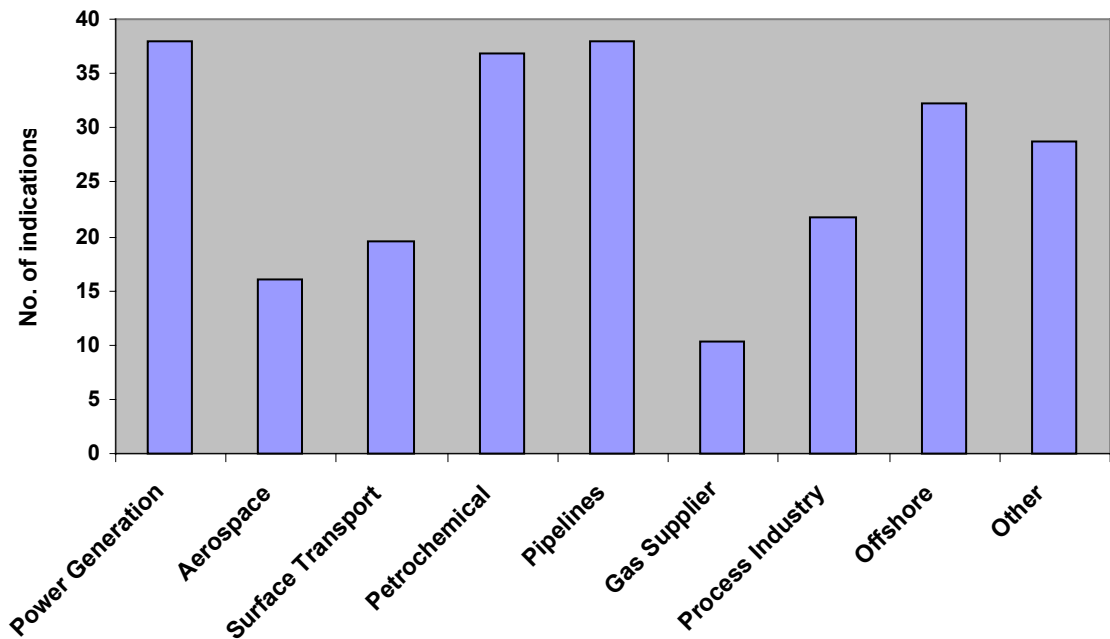


Fig. 4a – Breakdown of the fields of activity of the respondents’ organisations

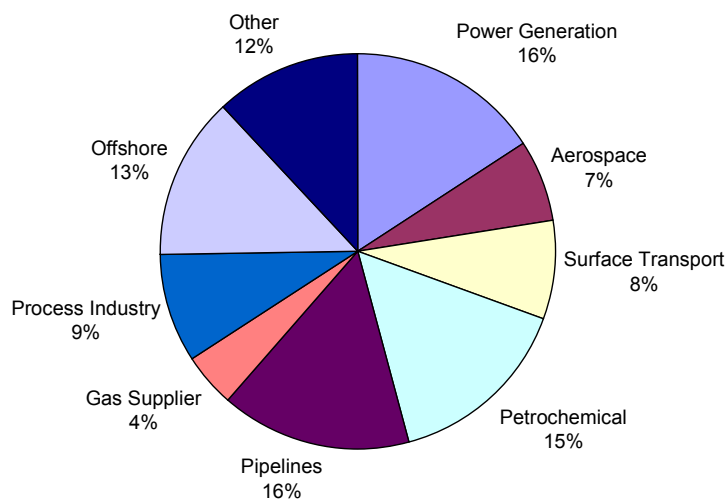


Fig. 4b – Breakdown of the fields of activity of the organisations that replied to the survey – percentages.

4.2 Section 2: Use of FFS Technology

The aim of this section was to collect information concerning the actual use of FFS technologies, establish the range of procedures and methodologies used, what they monitor and the main difficulties encountered during their implementation.

4.2.1 Questions 5 & 6 : When and by whom is FFS assessment performed?

When asked to indicate whether they are using the FFS assessment,

- During design,
- After manufacture, i.e. qualification for service, and/or
- During service (re-rating, life assessment).

most of the respondents chose more than one options. During service for life assessment or re-rating are the most frequently used FFS assessments, as indicated by 81% of the responses given, see Figure 5. While a bit less than half of the respondents indicated that a great deal of assessments are carried out also during the design phase and after manufacturing. Also, the responses showed that in the majority of the cases (81%) the assessments are carried out by in-house engineers.

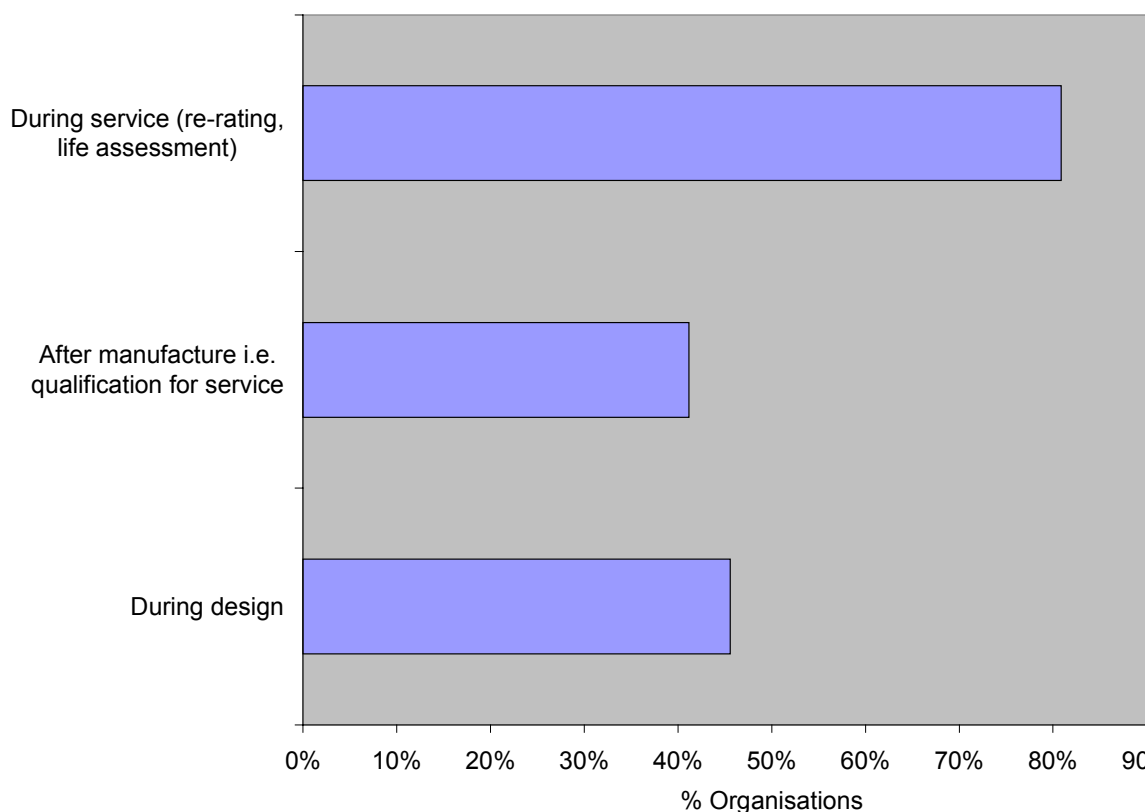


Fig. 5 – Breakdown of when FFS assessment is performed.

4.2.2 Questions 7 & 8: Which procedures do you use for FFS assessments? Are you in favour of a European FFS Code?

-

The respondents were asked to indicate which assessment procedure they applied from the following list (it was possible to indicate more than one procedure):

- API 579
- BS 7910 / PD 6493
- R5
- R6
- Other (please specify)
- ETM
- A16
- SINTAP
- ASME

From the replies received (Fig. 6) it emerged that the BS7910 / PD 6493 code is the most popular, although the R6, ASME and SINTAP procedures have strong followings.

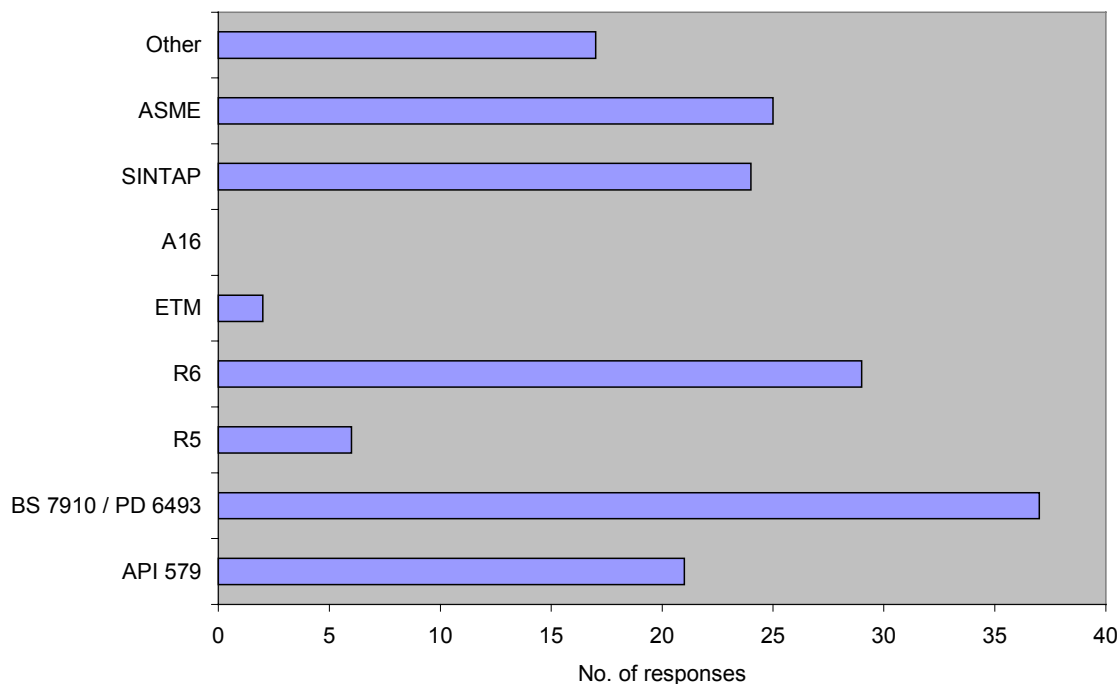


Fig. 6 – Usage of FFS procedures.

Under the “other methods” the following procedures were listed:

- DNAE
- J-integral, FEM-based procedures
- National regulations
- Pipeline specific
- In-house developed procedures
- RSTRENG
- DNV RP F101/SACC
- EUROCODE 3
- OMEGA for Creep
- FAA
- RCCM-RSEM

Respondents were further asked to indicate their personal preferred choice for FFS procedures, should they were given the freedom to choose. The results are shown in Fig. 7 and although “other” methods was indicated by almost 15% of respondents, interestingly the ASME code had only 6% of the preferences, the R6/R5 15% and the BS7910 was considered by far as top choice by 49% of respondents.

The reasons for choice of a particular procedure were also revealing in that the majority of respondents put ‘wide recognition’ and familiarity first (Fig. 8) whereas some respondents indicated accuracy as very important for making a specific choice. Finally a good number of respondents feel that acceptance by a notified body is a fairly good reason for selecting a FFS procedure. This shows the challenge ahead of having harmonised standards, winning acceptance and underlines the importance of taking action to promote their usage at every level. Indeed, the need for a European FFS Code was strongly pointed at by 90% of the respondents, as seen in Figure 9. A closer on the 10% not in favour of a European code showed that three of these respondents came from EU candidate countries, 2 from the UK and two from the Netherlands. Of more concern, 4 of them were end users (corresponding to 30% of the end-use respondents). This points to a continued need to address the concerns of organisations who are ultimately paying for FFS studies.

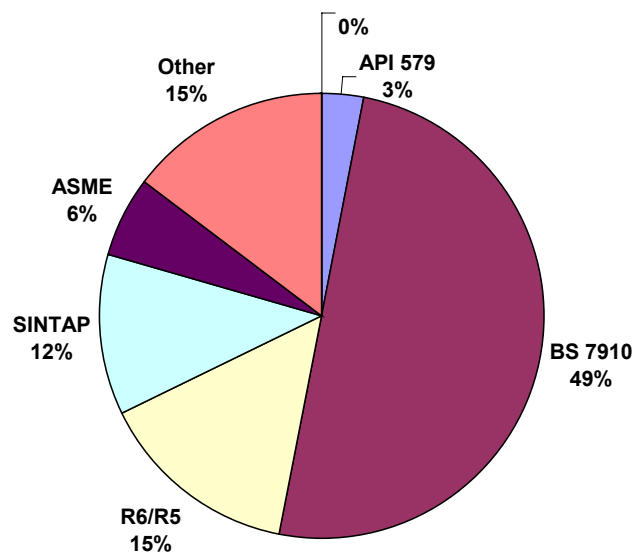


Fig. 7 – Preferred FFS assessment code, given a free choice.

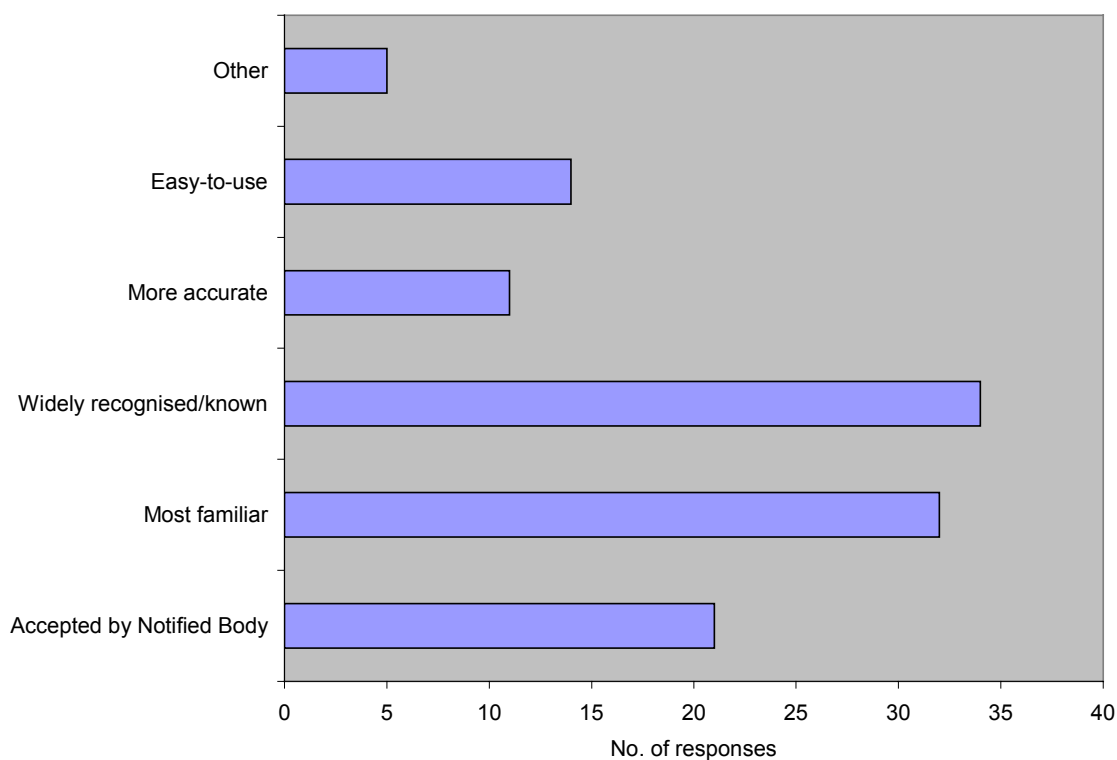


Fig. 8 – Reasons for choice of a FFS assessment procedure.

Are you in favour of developing a European FFS Code?

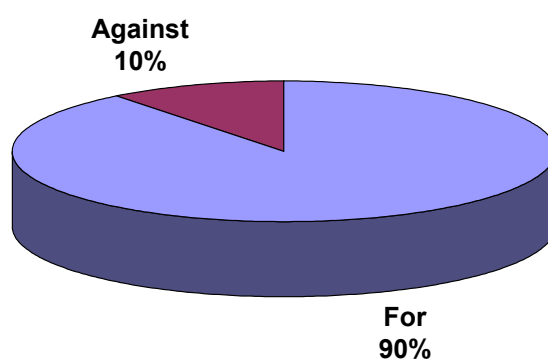


Fig. 9 – Percentage of replies in favour of a European FFS Code.

4.2.3 Question 9: What are the main difficulties in performing FFS assessments?

The survey asked the respondents to identify the type and level of difficulties they encounter while performing FFS assessments, from the following list. It is noted that more than only one indication could be given.

- Estimating applied loading /loading history
- Material properties
- Stress analysis
- NDE reliability
- Adequate rules available
- Failure modelling (fracture, collapse, creep)
- Availability of skilled personnel
- Residual stresses
- Complexity of rules
- Other (please specify)

The distribution of replies is shown in Fig. 10, from which the main difficulty emerges as estimation of residual stresses, as well determining the loading and thermal history. This is therefore an area in which guidance is needed in future assessment standards and hence further initiatives would appear to be very important. There was no entry in the “Other” section.

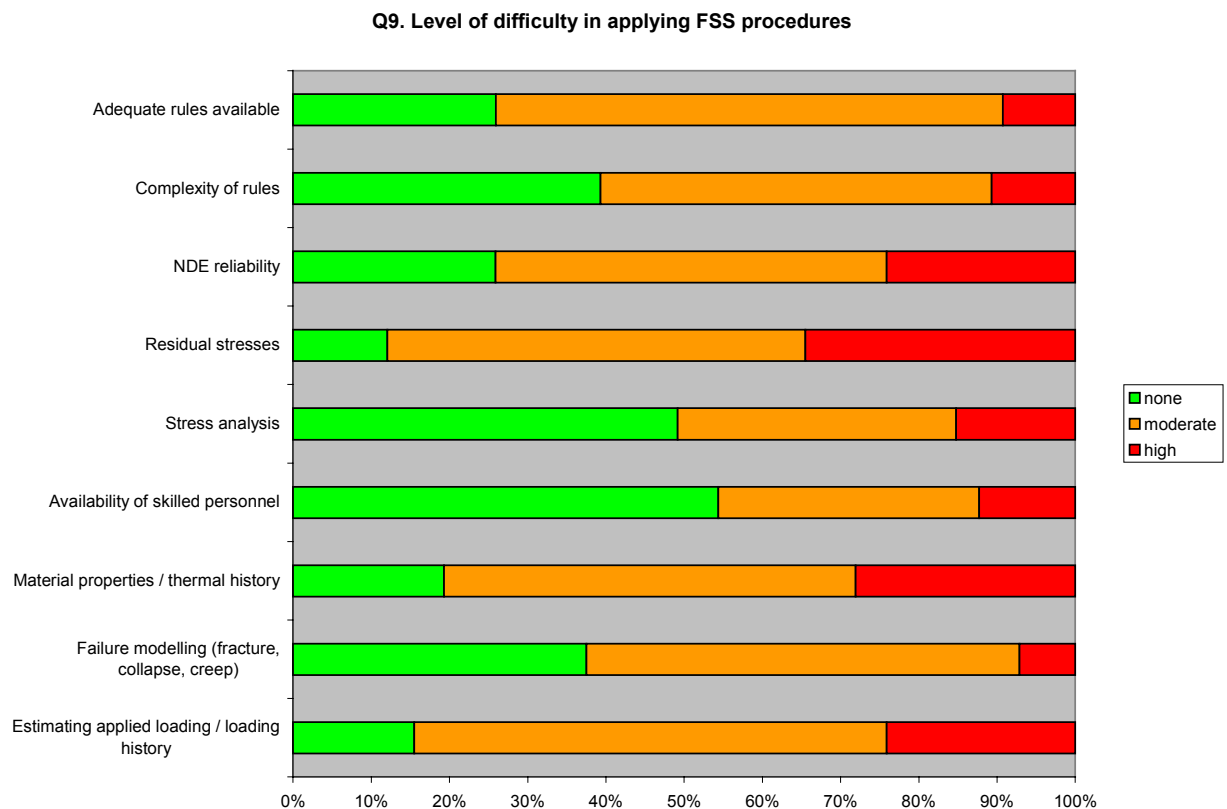


Fig. 10 – Level of difficulty encountered in addressing different aspects of FFS assessments.

This assessment was then repeated by breaking down the results according to organisational size, as shown in Figs. 11a (high rate difficulties encountered by organisation) and 11b (moderate and high difficulty issues encountered). For small companies (less than 50 staff), the factors relating to residual stresses and material properties but also reliable NDE procedures are all strongly identified and considered to be of equally high difficulty. For the medium size companies (50 to 500) a similar general situation is apparent (bearing in mind that there are a lot more respondents), with residual stresses given marginally more replies. However issues such as estimation of loads marks third high for medium-sized firms followed by NDE reliability. Larger firms that dominated the replies are also on a rather similar trend with the residual stresses being the most frequently cited problem area. Finally, the replies also indicate that medium-sized firms do not feel particularly challenged by the complexity and availability of adequate rules for FFS procedures (Figs.11a, 11b), whereas this issue apparently is of considerable concern to large organisations.

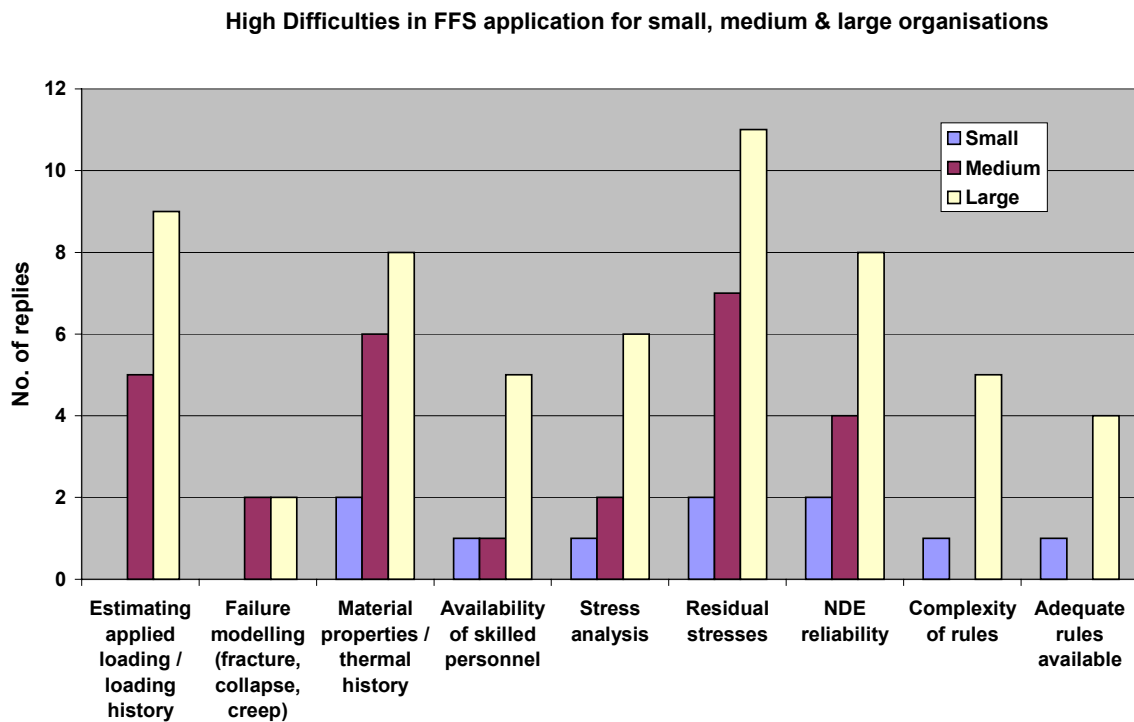


Fig. 11a – Most challenging issues when applying FFS assessments broken down by organisational size.

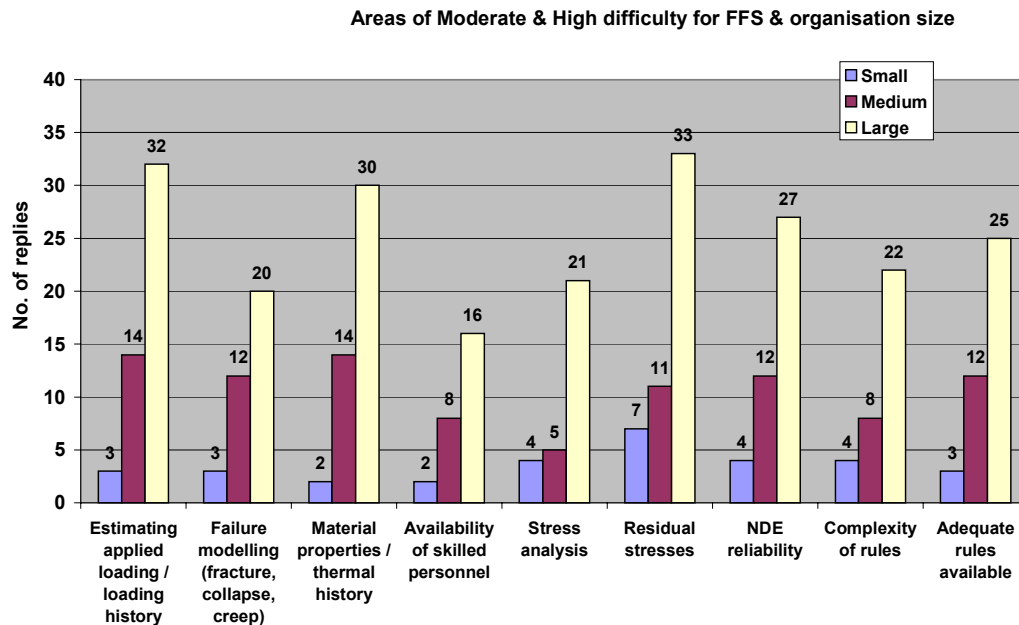


Fig. 11b – Areas of high and moderate difficulty for organisations during the application of FFS procedures.

4.2.4 Question 10: Which damage assessment is most relevant in the overall FFS assessments you perform?

Here the respondents were asked to fill in percentages in terms of relevance next to each of the following damage criteria: static fracture, plastic collapse, creep failure, fatigue and finally corrosion assessment. As expected, see Fig. 12, static fracture and fatigue were identified as the most relevant damage criteria with corrosion damage getting 17% in terms of importance.

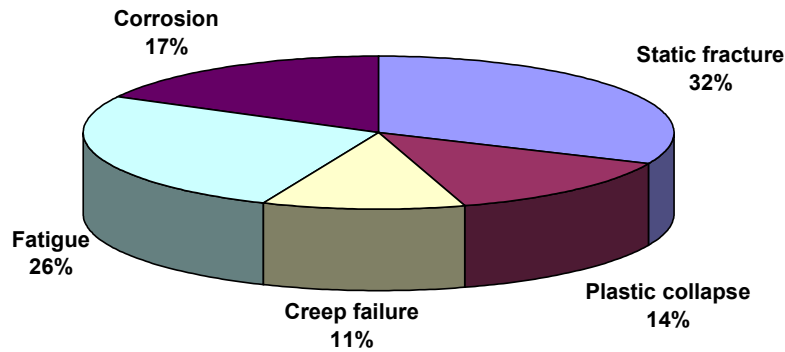


Fig. 12 – Most relevant damage criteria in overall FFS assessments.

4.2.5 Question 11: Usage of software

Software is frequently cited as a problem area in all types of FFS assessment and the aim of this question was to get a picture of which tools are currently being used to support these types of assessments. It was divided in two parts: the first to identify the type(s) of software product(s) being used and secondly to check whether this tool was being applied solely for stress analysis or also for damage assessment (static fracture, plastic collapse, creep failure, fatigue, corrosion) or life assessment itself i.e. as a post-processor or even for assessment from online monitoring. First of all, 63% of the respondents are actually using computerised systems to support FFS assessments. Concerning the type of software, the following entries were made:

- | | |
|--|-------------------------------|
| - ANSYS | - ABAQUS |
| - MARC2001 | - COSMOS |
| - NASTRAN | - FFS-FEACRACK |
| - CRACKWISE | - CETIM-SECURE, -FATIGUE |
| - FRACTURE GRAPHICS | - NISA II |
| - Fracture/Fatigue-WISE | - FEA CRACK |
| - BESPOKE | - PROBAN |
| - MATHCAD | - RPF |
| - NASCRAC | - SOLSTICE |
| - SACC (Safety Assessment of Cracked Components) | - RELAP5 |
| - ADLPipe | - ALGOR |
| - Castem2000 | - WFM |
| - IWM-VERB | - SINTAP |
| - R6 | - R-codes |
| - RPF101 spreadsheet | - In-house developed software |
| - Excel-based software | - IWM-VERB |

The information regarding the software products, as expected could be divided into the FE analysis programs and into the software used to analyse and interpret the results – assessment and support software. A variety of Finite Element programs are used by 40% of the respondents who replied to this question. In regard to the assessment software, CRACKWISE appears to be the most popular tool, used by 33% of respondents whereas a great number of diverse other products were identified. In many cases, corresponding to 28%, it was indicated that in-house developed software tools are also used, along with commercial Finite Element or other software packages.

The breakdown of answers with respect to the type of support for damage assessment that the software tools give, is given in Fig. 13. In most of the cases the software programmes support statistic fracture, plastic collapse and fatigue assessment, whereas only in very few cases are software packages used for on-line damage monitoring.

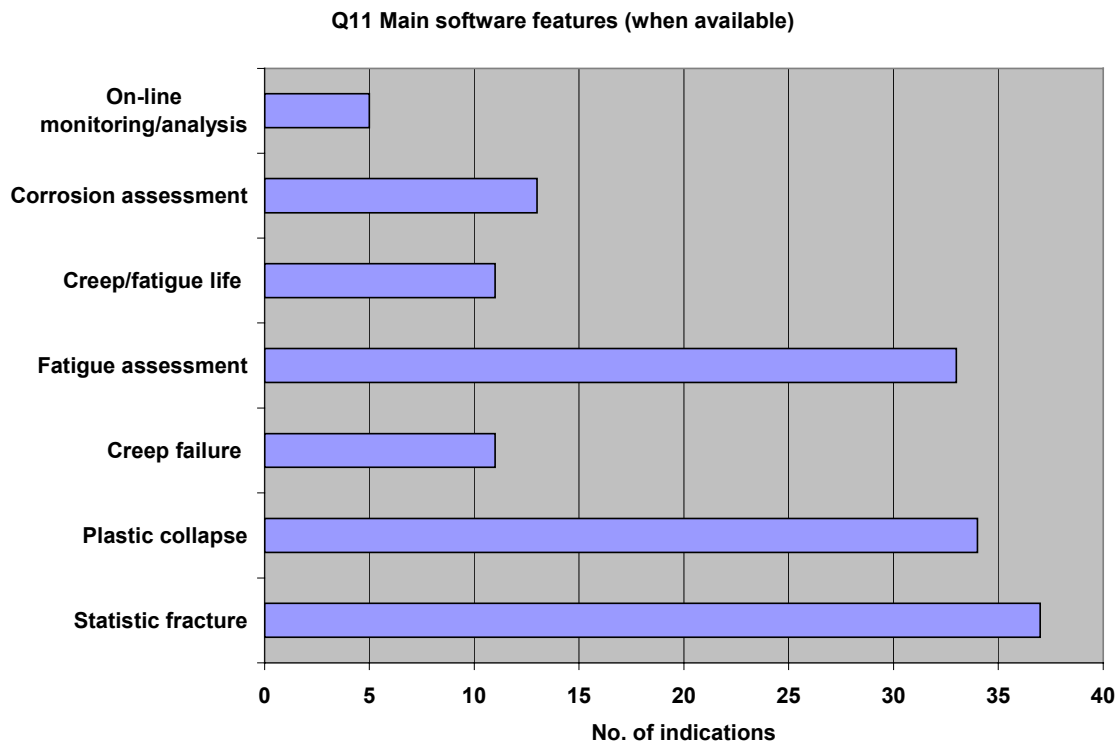


Fig 13 – Main software features.

4.3 Section 3: Training Needs

This section was specifically intended to gather data regarding training needs and priorities related to FFS procedures, but it also posed the question of whether a professional qualification for competence in application of FFS technology is needed.

4.3.1 Question 12: Is there a need for training to FFS procedures ?

Quite interestingly 19% of the respondents felt that there is no need for training related to FFS procedures and 62% of these negative answers came from respondents working in multi-national Organisations. However it is worth noting that overall the strong majority (75%) of multinational Organisations and in total an encouraging 81% of all who replied to this questionnaire stated that there is indeed a strong need for training.

Q12 - Is Training needed?

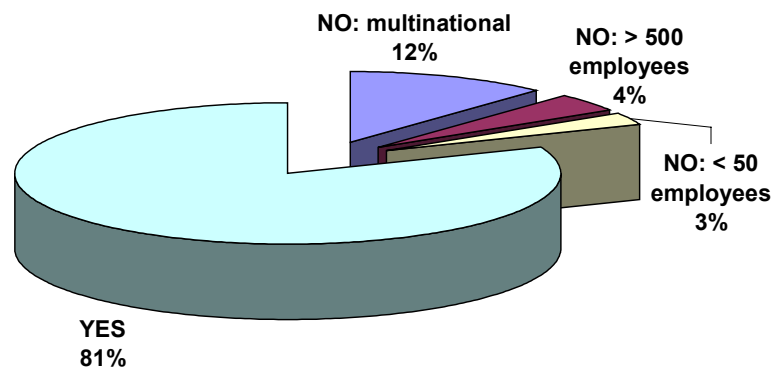


Fig 14 – Need for training related to FFS procedures.

4.3.2 Question 13: What type of training should be given priority ?

For this question the respondents were requested to rank the training priorities from the list given below:

- Practical application of procedures
- Basic theory and concepts
- Advanced training – newest developments in procedures

As evident from Figure 15, most of the respondents felt that the outmost urgency is to provide training concerning the practical applications of the FFS procedures and then target the basic theory and concepts behind these specific procedures. As anticipated, only a small percentage, just 11%, of replies gave advanced training to newest developments in procedures as top priority.

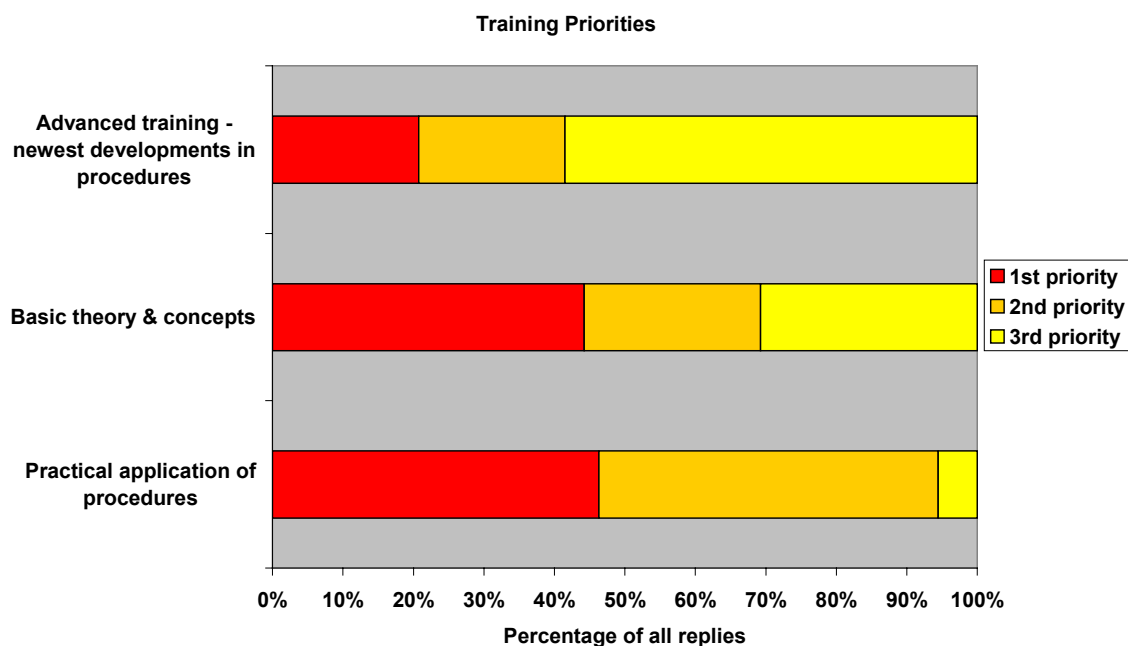


Fig 15 – Training priorities related to FFS procedures.

4.3.3 Question 14: What priority do you give the following for FFS training?

To further investigate the FFS training needs, this question asked the respondents to give priority ranking (low, medium, high) for specific training on the items listed below:

- Damage criteria/failure modes
- Inspection
- Material characteristics
- Other (please specify)
- Loads and stress analysis
- Online condition monitoring
- Integrity & life assessment concepts

Based on the replies given a strong majority indicate a need for training related to integrity and life assessment concepts. Apparently, from Fig 16, there is an equal interest in training when it comes to addressing issues such as damage criteria, material characteristics, whereas stress analysis and inspection are also strongly supported as potential target areas.

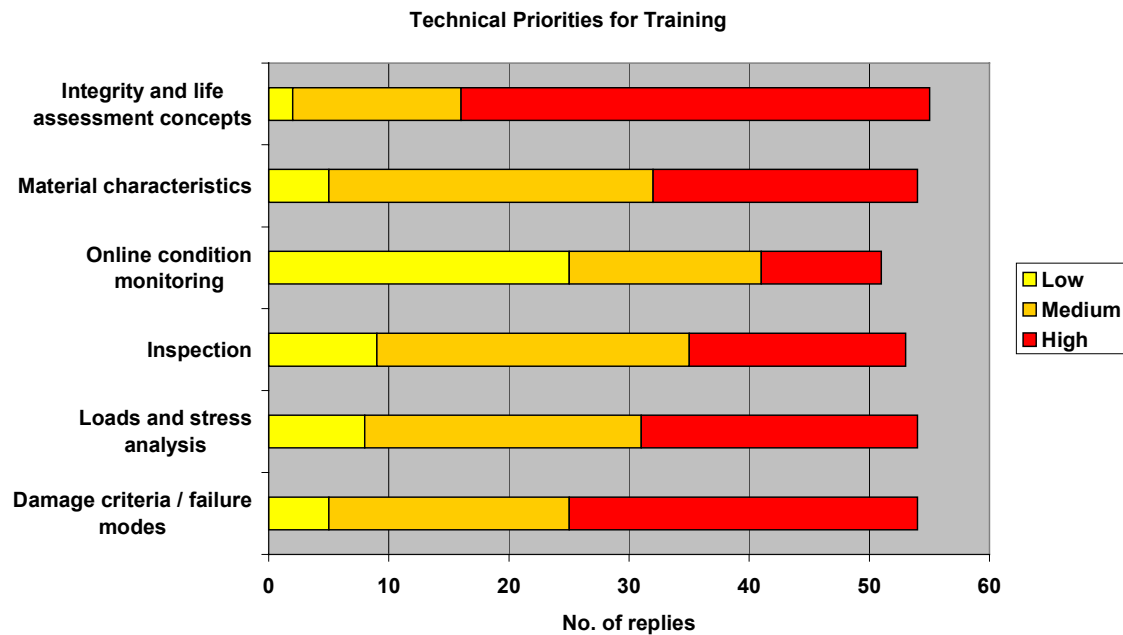


Fig 16 – Technical training priorities related to FFS procedures.

4.3.4 Question 15: Would your organisation be interested in FITNET training courses, what type and duration?

When asked to indicate whether they will be interested in participating in training courses organised by FITNET, 68% replied positively (Fig. 17) with the majority of them favouring courses organised externally (Fig. 18) and lasting few working days but less than a week (Fig. 19). A good percentage of respondents recognising the flexibility and potential of e-training tools showed an interest in them, whereas only 19% felt that in-house courses were the best option.

Q15. Interest in Fitnet Training Courses

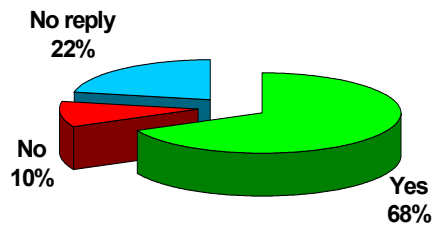


Fig. 17

Q15 Location of training

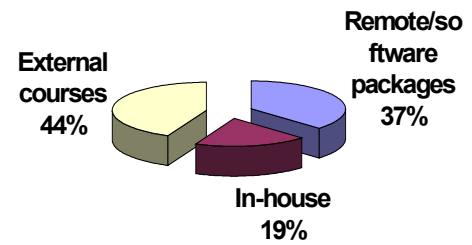


Fig. 18

Figs 17 and 18 – Interest in participating in FITNET training courses.

Q15 Preferred duration of training sessions

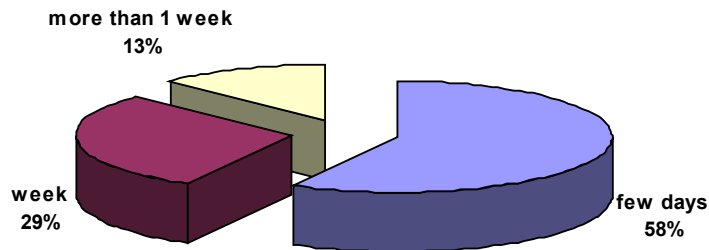


Fig 19 – Duration of training sessions.

4.3.5 Question 16: Should there be a professional qualification for competence in the application of FFS technology?

Almost two thirds of the respondents (Fig. 20) are of the opinion that a professional qualification for competence in the application of FFS technology should be established. Individuals then could be accordingly certified after following courses including general and specialist modules on FFS technologies and also acquiring a strong practical work-experience. Even though this is the most prevalent feeling, still a rather high percentage of respondents, 37%, which can not be ignored, feel that such a qualification is probably not needed or at least it should be treated as an additional qualification (in terms of quality of performing the work) and not as a legal requirement for applying FFS procedures. There was only one explicit comment made on this subject, under Q21. Nevertheless, such a proposal for establishing a professional qualification for FFS competence and the conditions for its implementation could probably be the object of further investigation under a specific questionnaire

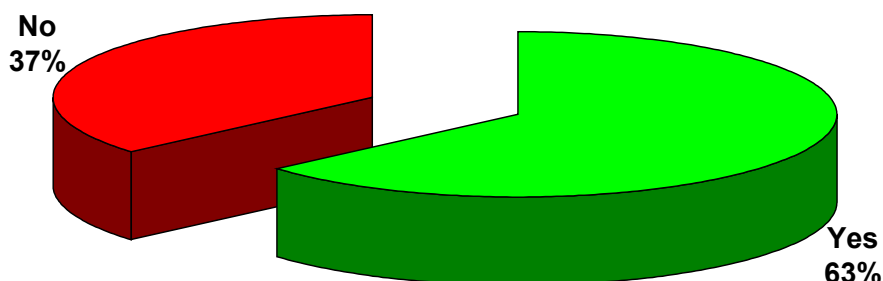


Fig 20 – Reaction to a proposal for a professional FFS qualification

4.4 Section 4: R&D Priorities and Support Tools

This section was designed to establish a list of the highest future priorities in terms of Research and Development and to indicate possible needs for support tools in order to promote the use of FFS methods.

4.4.1 Questions 17 & 18: Is your organisation active in R&D for FFS methods and in which areas ?

Overall 45 respondents out of 68 indicated that their organisations were active in R&D relating to FFS methods and all of them filled in the R&D specific questions. Respondents were asked in particular to indicate one or more of the following areas in which their organisations is performing FFS related R&D:

- Fracture
- Creep
- Corrosion
- Analytical
- Other (please specify)
- Fatigue
- Creep-Fatigue
- Inspection techniques
- Probabilistic assessment

As evident from Fig. 21, the replies received show that the majority of the organisations are currently conducting research on fracture and fatigue related damage, although inspection/monitoring techniques and probabilistic assessment methods are also attracting a lot of interest by their R&D departments.

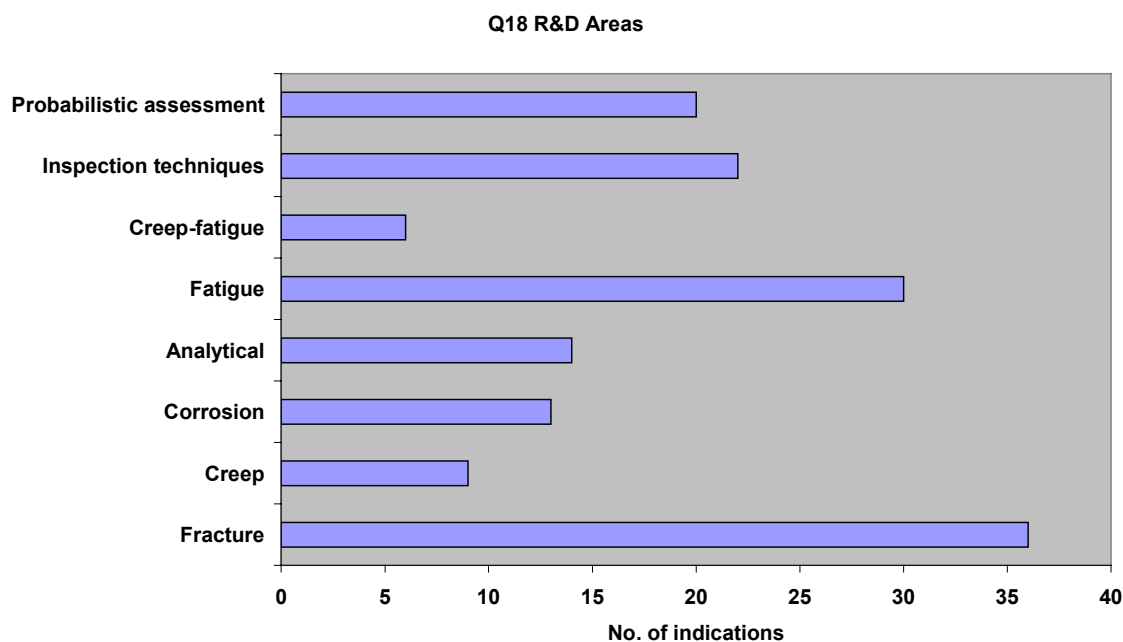


Fig 21 – Main areas where FFS related R&D is performed

4.4.2 Question 19: Which are your organisation's R&D FFS priorities?

In order to investigate further the R&D issues in this area, respondents were requested to rank the following in order of priority to their organisation:

- Improved feasibility of stress analysis
- Improved residual stress procedures
- Improved fatigue assessment procedures
- Improved corrosion assessment procedures
- Better materials data
- Other (please specify)
- Improved load assessment methods
- Improved fracture assessment procedures
- Improved high temperature assessment procedures
- Probabilistic methods
- Better defined materials sampling methods

The replies are shown in Fig. 22. All areas received indication of importance, however it may be significant that better materials data received more high priority ratings than either stress analysis or assessment procedures, but this can also be due to the fact that it was rated high by large companies (more than 500 employees) from where most of the responses came (see Fig. 23).

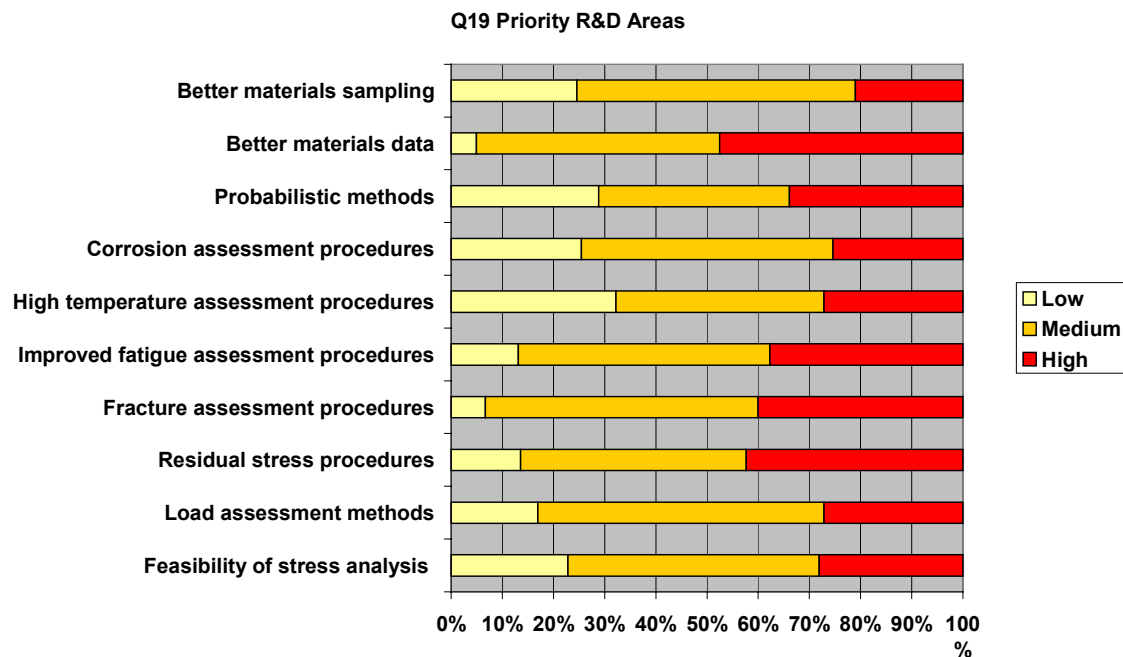


Fig 22 – General R&D priorities for FFS

Nevertheless, as seen in Figure 22, overall, even if both the medium and high priority ratings are considered, better materials data is still seen as most important, followed closely by improved fracture, residual stress, fatigue assessment procedures, then load assessment methods and feasibility of stress analysis. Improved high temperature assessment procedures and probabilistic methods are rated rather low in relation to the other topics.

A breakdown in terms of organisation size was also made and is shown in Fig. 24, however the overall emphasis on better materials data is a common factor for medium and large size organisations whereas small size organisations of less than 50 employees feel that their research priorities lie on load and high temperature assessment procedures.

Under the heading “Other” the following items were mentioned: strain based analysis in the plastic regime (was given a high priority rating), on-line materials testing and Non-Destructive Evaluation.

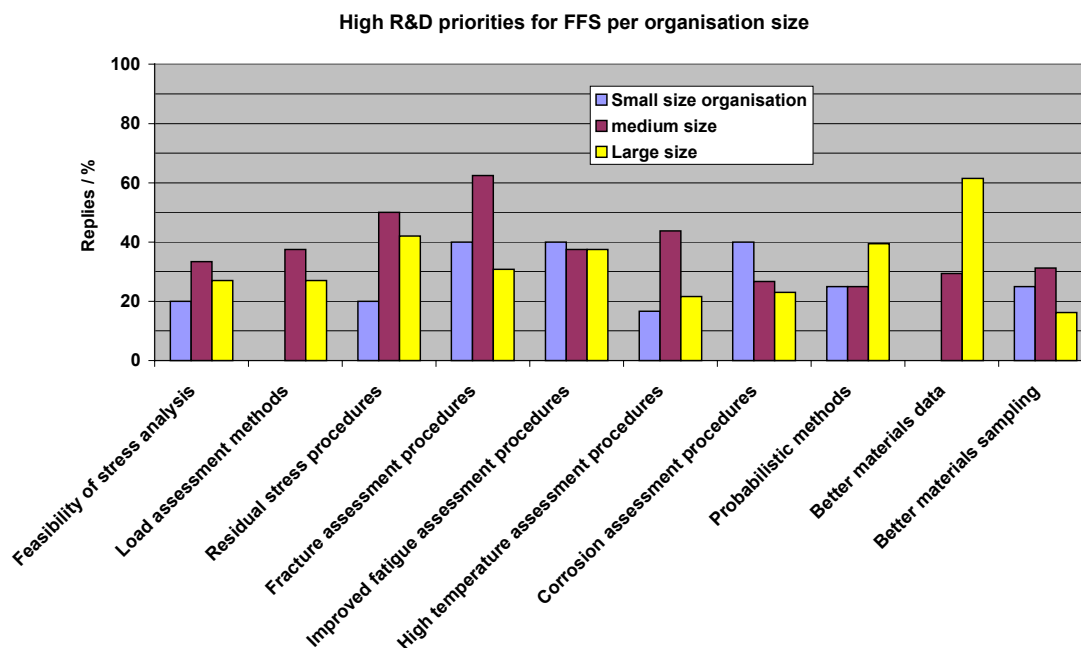


Fig 23 – High R&D priorities for FFS per organisation type – small: <50 employees, medium between 50 and 500, large:>500 employees.

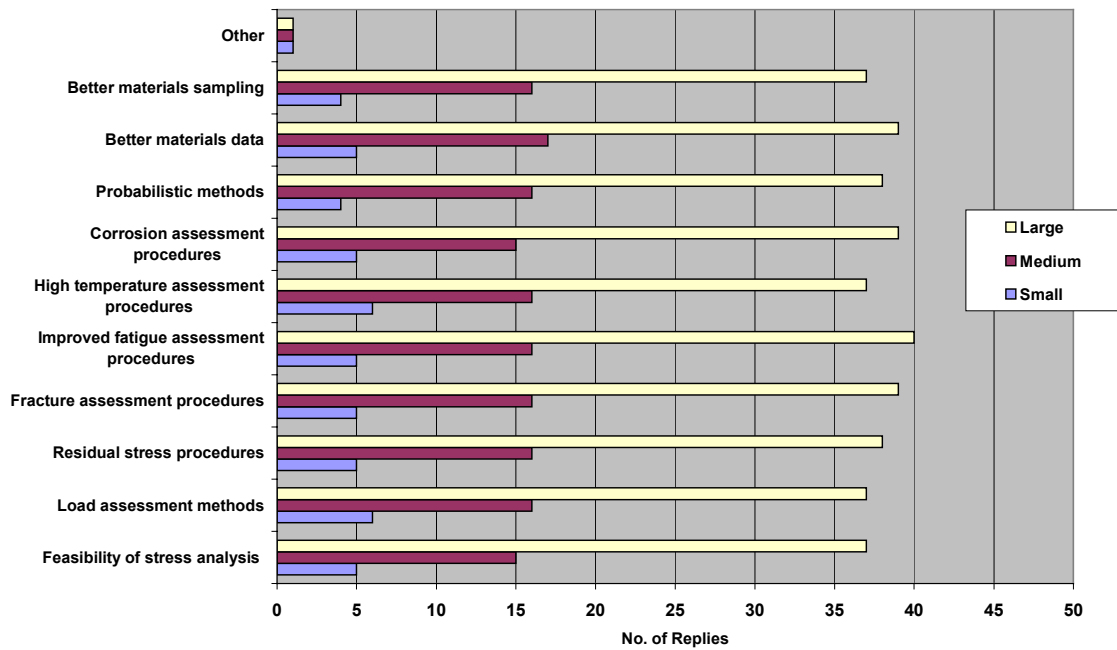


Fig 24 – Overall (all ratings: low, medium and high priority) R&D priorities for FFS per organisation type– small: <50 employees, medium between 50 and 500, large:>500 employees.

4.4.3 Question 20: What type of support is needed to promote use of FFS methods?

In the final question in this section, the questionnaire asked the respondents to identify the type of support they consider as important for promoting the use of FFS methods. The options were as follows:

- Access to expertise
- Software tools
- Verification cases
- General procedures
- Qualification tools
- Other (please specify)

The results are shown in Fig. 25 indicating a fairly balanced approach to need for support tools such as verification cases, software and general procedures. A smaller percent of respondents, around 15% felt that also access to expertise and qualification tools could be important tools for promoting FFS procedures. Under “Other” there was mention of recognised standards, training / education and general awareness.

Q20. Type of support needed to promote FFS

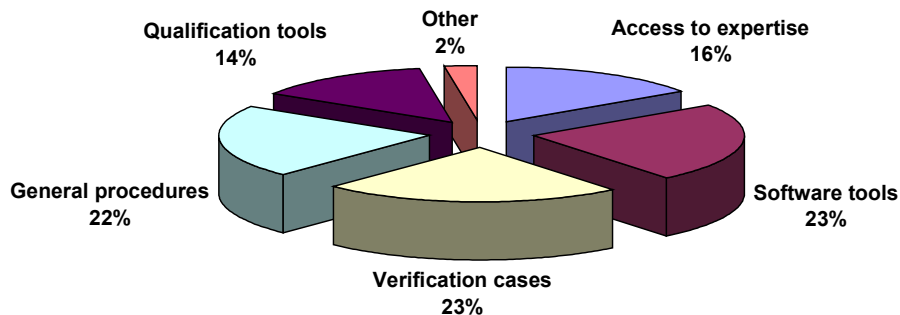


Fig 25 – Support tools needed for endorsing the use of FFS procedures.

4.5 Section 6: Final Thoughts

A final section in the questionnaire was given over to comments. Sixteen respondents took advantage of the opportunity, and their thoughts (translated in English in several cases) are listed below in no special order.

- R66. As Nuclear Power Plant with a licence in accordance with USA Regulations we shall follow American Rules for primary systems and components. We have some possibilities to follow EU standards for secondary systems & components.
- R62. Since I am involved in R&D, I think that it is important that the next European procedure/standard should consider the current research directions, i.e. should stay open for involving newly developed techniques and analyses, methods.
- R61. We have applied FFS procedures for 25 years!
- R58. this survey and questionnaire is very good, useful and actual.
- R55. It would be good if the opinion of expert engineers (private) was also asked not only companies. There are many examples - not only in Hungary - that experts working on private labs are involved in FFS. The education should be based on real cases, involving experts working in the field of FFS. The training and education of NDT people is absolutely necessary and important. This can be supported by the introduction of MS2 EN473-2001 standard.
- R54. Our requirements for fitness for purpose are generally tied in with contractual/warranty- based issues. Our aim is to comply with specification and our opinion is that guidance for carrying out fitness for service analysis is inadequate at present.

- R52. A European or international qualification for FFS practitioners should be established – initially it would refer to the most widely used standards, e.g. BS7910/ API 579.
- R41. Adoption of existing fitness for purpose standards throughout Europe.
- R40. It is important that FITNET efforts encompass all of the work that has been done in all of the industries that use Fitness-for-Purpose methods and does not reinvent the wheel of neglect industry specific initiatives. The pipeline industry has developed a number of pipeline specific Fitness-for-Purpose assessment methods and has produced industry guidance, e.g. EPRG, ASME B31.8S, API 1160, the Pipeline Defect Assessment Manual (PDAM). PDAM is a joint industry project conducted by PENSPEN INTEGRITY and sponsored by fifteen international oil and gas companies. A European FFS code should not be prescriptive or restrictive and should recognise industry specific needs. There would need to be a commitment of funding for regular updates of the code. The issue of its relationship to regulations would need to be carefully considered. For information, PENSPEN INTEGRITY has run over twenty international courses (both in-house and public) on pipeline defect assessment.
- R36. We consider that a reliable evaluation of the risk of failure of components and structures must reduce considerably the number of accidents and also allow to obtain their best performance. Any advance in this field is welcome.
- R31. Each organization is different and has specific needs...this evaluation covers the overall area but it is also VERY general and does not address specific needs. Look forward to feedbacks and have more communication as one of the FITNET members.
- R26. Good questions.
- R21. I think a professional qualification would make sense, but not as a legal requirement to perform such work, rather an indication of professional quality, i.e. a voluntary additional qualification.
- R11. Certain questions are imprecise: plastic collapse concerns only very large defects for materials not used in ESP with limitations of constrain type DESP. It is essential that there is no duplication of existing work on European level and also very important to use what knowledge, codes and procedures are already available and validated by the different organisations, industries and research laboratories. There is a need to immediately produce a main procedure addressing a number of practical cases, for example plates, cylinders and spheres, under pressure loads, moments and thermal transients. The analytical aspect is not the most complex one, but issues such as materials property data necessary for the analyses are much 'heavier' and complex and their ignorance can cause important problems (risk of change of rupture mechanism). Uncertainties and confidence intervals and margins are equally important. Although less frequent, properly accounting for creep also remains a delicate issue.

There is indeed a need for a procedure, accepted and validated by all the partners. Training can be developed on-line and not in specific courses. We remain willing to contribute technically, but also at the training level.

- R7. Develop adequate tools (FFP-ECA) to cope with dynamic (shock) loads (see pressure vessels/piping systems).
- R4. I represent one of the Univ. of technology in Poland. In Poland we do not perform Failure Assessment analysis often since we are not asked for this by industrial partners. As far as I am aware, such an analysis is not performed by Polish industry. The main reason is that FA procedures are not widely known.

5 CONCLUSIONS & RECOMMENDATIONS

In October 2002 a survey on “Current application and future requirements for European Fitness-for Service Technology” was distributed to a number of organisations that use Fitness-for-Service procedures. 68 replies were received, corresponding to an overall reply rate of 14%. The response rate was rather lower than anticipated, particularly from some of the larger countries, which have a strong tradition in FFS procedures. The weight given to the results of the survey should bear in mind the restricted sample size.

Concerning the profile of the respondents, engineering service organisations and research institutes constituted almost 48% of those replying, whereas the remaining 52% were split between industrial research, end-users and academic organisations. With respect to the size, most of the replies (61%) came from large organisations (more than 500 employees) whereas in terms of field of activity a good balance was obtained, with organisations covering the power generation, petrochemical, pipeline, offshore and process industries.

According to the replies received, the following conclusions can be drawn:

- Fitness-for-Service assessments are mainly conducted during service (re-rating, life assessment), by in-house engineers.
- Regarding the Fitness-for-Service procedures, the most popular are the BS7910/PD6493, followed by R6, ASME and SINTAP, with a fairly large number of organisations relying on application-specific, in-house developed procedures. It also emerged that wide recognition and familiarity with a procedure is the most likely reason for its choice, rather than technological considerations or acceptance by notified bodies. This underlines the task ahead in establishing harmonised Fitness-for Service assessment procedures. Encouragingly, 90% of the respondents confirmed their strong interest in the development of a European Fitness-for -Service Code.
- The major difficulties encountered in applying Fitness-for-Service assessments were found to be the estimation of the residual stresses and of the applied loads/ loading history of the components. Material properties /thermal history i.e. ageing, were voted as almost equally challenging to these. The replies also confirmed that there is still need for improvement, probably not as urgent as the aforementioned issues, when it comes to NDE reliability and the presence of adequate rules for applying FFS procedures. However, even though that was the overall feeling, the level of difficulty identified in the survey for these different issues was found to depend somewhat on the size of the organisation replying. Large companies (> 500 staff) and medium-size organisations identified residual stresses as the most problematic area, whereas small sized firms were equally concerned about the material properties/thermal history and the availability of reliable and easy to apply NDE methods.
- As would be expected, almost two thirds of the respondents are using computerised systems to support FFS assessments, and mainly statistic fracture, plastic collapse and fatigue assessment. For finite element analysis software, some known commercial packages such as ANSYS predominate, whereas in the area of assessment/supporting software the

‘CRACKWISE’ program seems to be the most popular package. Nevertheless, there is a great range of products used and in many cases these are in-house developed modules.

- 81% of respondents agreed that there is a need for training to FFS procedures with the majority of the replies giving top priority to training for practical application of these procedures. Concerning technical content of training, the respondents seem to prefer general topics such as integrity and life assessment concepts or damage criteria, rather than more specific fields.. Online condition monitoring ranked lowest in the priority list for training items. A strong interest in prospective FITNET courses was registered. The most popular options were externally organised courses of few days duration but also training through software packages, taking advantage of new technologies and e-learning tools.
- Two thirds of the responses gave encouragement to a possible development, of a professional qualification for competence in the application of FFS technology. For the other third against such an initiative, one factor may be the fear that it could become a legal requirement as opposed to simply an indication of professional quality.
- Most of the organisations indicated that their R&D activities related to FFS focus on issues such as fracture, fatigue and inspection techniques. Overall their future R&D priorities are to improve the materials data available (highest ranking R&D priority theme for large companies, in particular) and then the assessment procedures. However, small and medium-sized firms feel that fracture assessment will also be in the near future the main challenging issue for their R&D departments. Large companies ranked as the lowest priority item the improvement of materials sampling whereas overall there was not such a strong interest in granting top priority to research for improving high temperature assessment procedures and probabilistic methods.
- Respondents identified verification cases, software tools and availability of general procedures as equally important tools for promoting FFS methods.

Based on the results, the recommendations to the FITNET group are as follows:

- a) FITNET should follow-up on the development of a European FFS procedure
- b) R&D should address as priority the development of:
 - Better materials data
 - Improved assessment procedures and accurate residual stresses determination
- c) Training should focus on practical application of these procedures and on the concepts of FFS technologies.
- d) Action is needed to promote the development of software products and verification cases to support analysts.

6 APPENDIX (SURVEY TEXTS IN ENGLISH, FRENCH, GERMAN, HUNGARIAN AND ITALIAN)

Survey of Current Application and Future Requirements for European Fitness-For-Service (FFS) Technology

Background:

The FITNET Thematic Network was launched in February 2002 to promote the development of a European Fitness-for-Service Procedure for assessing the structural integrity of metallic structures transmitting loads. In particular, it covers techniques for dealing with known or postulated defects and will consider the failure modes of fatigue, fracture, creep and environmental assisted cracking. The network harnesses recent technological advances from EC-funded projects, national programmes and in-kind contributions. Working groups have been established to:

- review existing standards
- create a database of validation tests, and
- produce consensus recommendations for a European structural integrity assessment procedure.

It is a progression of the SINTAP work and involves over 30 organisations all with recognised expertise in this area, drawn from 13 European countries. The co-ordinator is GKSS. The project is part-funded by the European Commission under the FP5 Growth Programme.

Further information on FITNET can be found on the network website - www.eurofitnet.org.

This Survey

The survey aims to provide a picture of the current status of fitness-for service technology and to evaluate the priorities for the development of a European fitness-for-service code. The results will help the FITNET group better direct the programme of the thematic network and to formulate new R&D actions. The survey is being co-ordinated by the European Commission's Joint Research Centre (leader of FITNET Work Package 2).

Instructions

The questionnaire is made up of the following sections:

- Organisation Type
- Use of FFS Technology
- Training Needs
- R&D Priorities and Support Tools
- Final Thoughts & Comments

You may find it useful to read the entire questionnaire before answering. Most responses can be made with a simple tick. If you do not wish to answer any questions, simply leave them blank. It is emphasised that this survey is confidential; no individual view will be identified; no individual view will be attributable in the report in which the results of this questionnaire will be discussed. The survey organisers will prepare a report summarising the results and recommendations. This will be distributed to all organisations that reply and supply contact details in Section 5 of this survey.

Please return the completed questionnaire as soon as possible to:

European Commission DG JRC

Mrs. Patricia LEJUSTE
P.O. Box 2
NL – 1755 ZG Petten
Fax: +31.224.56 5623
Email: Lejuste@jrc.nl

Your co-operation is most appreciated. However please note that replies must be received by **31st October 2002** for **them to be included in the evaluation process**.

Note: Our apologies if you have received this survey more than once. It has been impossible to avoid some overlap in the different mailing lists used.

Fitness-For-Service (FFS) Survey

Section 1: Organisation Type

1. Size and Type

- Is your Organisation multi-national? Yes ☐ No ☐
- Size (total staff): less than 50 ☐ 50 to 500 ☐ more than 500 ☐
- FITNET member? Yes ☐ No ☐

2. Role of Organisation

- Component Manufacturer ☐ End-User ☐ Engineering Services ☐
- Industrial R&D ☐ Academic ☐ Research Institute ☐
- Safety Authority ☐ Other (please specify) _____

3. Sectors or fields of activity:

- | | |
|--|---|
| Power Generation ☐ | Pipelines ☐ |
| Aerospace ☐ | Gas Supplier ☐ |
| Surface Transport ☐ | Process industry ☐ |
| Petrochemical ☐ | Offshore ☐ |
| Other (please specify) _____ | |

Section 2: Use Of FFS Technology

4. Does your organisation perform FFS assessments?

Yes ☐ No ☐

5. When is FFS assessment performed?

During design ☐
After manufacture i.e. qualification for service ☐
During service (re-rating, life assessment) ☐

6. Who conducts FFS assessments?

In-house engineers ☐
External company ☐

7. Which procedures do you use for FFS assessments?

Procedures applied:	API 579	☐	ETM	☐
	BS 7910 / PD 6493	☐	A16	☐
	R5	☐	SINTAP	☐
	R6	☐	ASME	☐
	Other (please specify)	_____		

In situations where you are free to choose the procedure to apply:

- Which one would you select from the above list? _____

- Reasons for choice:

Accepted by Notified Body	☐
Most familiar to you	☐
Widely recognised/known	☐
More accurate	☐
Easy-to-use	☐
Other (please specify)	_____

8. Are you in favour of the development of a European FFS Code?

Yes ☐ No ☐

9. What are the main difficulties you encounter in performing FFS assessments?

	No Problem	Moderate Difficulty	High Difficulty
Estimating applied loading / loading history	☐	☐	☐
Failure Modelling (fracture, collapse, creep)	☐	☐	☐
Material properties / thermal history	☐	☐	☐
Availability of skilled personnel	☐	☐	☐
Stress analysis	☐	☐	☐
Residual stresses	☐	☐	☐
NDE reliability	☐	☐	☐
Complexity of rules	☐	☐	☐
Adequate rules available	☐	☐	☐
Other (please specify) _____	☐	☐	☐

10. Which damage assessment is most relevant in the overall FFS assessments you perform?

static fracture assessment	 %
plastic collapse assessment	 %
creep failure assessment	 %
fatigue assessment	 %
corrosion assessment	 %

11. Do you use a computerised system to support FFS assessments?

Yes ☐ Which software product(s) do you use: _____

Does this software give:

static fracture assessment	☐
plastic collapse assessment	☐
creep failure assessment	☐
fatigue assessment	☐
creep/fatigue life assessment	☐
corrosion assessment	☐
assessment from online monitoring	☐

Section 3: Training Needs

12. Is there a need for training related to FFS procedures?

Yes ☐ No ☐ (go to question 16)

13. What type of training should be given priority (please rank 1st, 2nd, 3rd)?

Practical application of procedures _____
Basic theory & concepts _____
Advanced training – newest developments in procedures _____

14. What priority do you give the following for FFS training?

	Low Priority	Medium Priority	High Priority
Damage criteria/failure modes	☐	☐	☐
Loads and Stress analysis	☐	☐	☐
Inspection	☐	☐	☐
Online condition monitoring	☐	☐	☐
Material characteristics	☐	☐	☐
Integrity and life assessment concepts	☐	☐	☐
Other (please specify) _____	☐	☐	☐

15. Would your organisation be interested in FITNET training courses?

Yes ☐ No ☐

If yes,

- are you particularly interested in:

training through software packages ☐
in-house courses ☐
“external courses” – could be held anywhere ☐

- how long should these training courses last? _____

16. Should there be a professional qualification for competence in the application of FFS technology?

Yes ☐ No ☐

Section 4: R&D Priorities and Support Tools

17. Is your organisation active in R&D for FFS methods?

Yes ☐ No ☐ (go to Question 19)

18. In what areas are you performing FFS related R&D?

Fracture	☐	Fatigue	☐
Creep	☐	Creep-Fatigue	☐
Corrosion	☐	Inspection techniques	☐
Analytical	☐	Probabilistic assessment	☐
Other (please specify) _____			

19. In terms of R&D for improved FFS procedures, please rank the following in order of priority to your organisation

	Low Priority	Medium Priority	High Priority
Improved feasibility of stress analysis	☐	☐	☐
Improved load assessment methods	☐	☐	☐
Improved residual stress procedures	☐	☐	☐
Improved fracture assessment procedures	☐	☐	☐
Improved fatigue assessment procedures	☐	☐	☐
Improved high temperature assessment procedures	☐	☐	☐
Improved corrosion assessment procedures	☐	☐	☐
Probabilistic methods	☐	☐	☐
Better materials data	☐	☐	☐
Better defined materials sampling methods	☐	☐	☐
Other (please specify): _____	☐	☐	☐

20. What type of support is needed to promote use of FFS methods?

Access to expertise	☐	General procedures	☐
Software tools	☐	Qualification tools	☐
Verification cases	☐	Other (please specify)	_____

Section 5: Final Thoughts & Comments

21. Do you have any comments on the issues raised by this questionnaire?

Thank you for sparing your time to fill in this questionnaire!

Looking forward to receiving your responses by 31st October 2002

To receive a copy of the Review of Answers please indicate your contact details:

Name:

Contact address:
.....
.....
.....
.....

Email:

Enquête d'application actuelle et des besoins futurs Pour la technologie européenne de l'Aptitude au Service (Fitness-for-Service FFS)

Historique:

Le réseau thématique FITNET a été lancé en février 2002 pour promouvoir le développement d'une procédure européenne pour "l'Aptitude au Service" afin d'évaluer l'intégrité structurale des structures métalliques transmettant des charges. En particulier, il couvre des techniques pour traiter des défauts connus ou postulés et considérera les modes de fatigue de rupture, de fluage et de la fissuration favorisée par le milieu environnant. Le réseau utilise les progrès technologiques récents générés par des projets financés par la CE, par des programmes nationaux et par des contributions personnelles. Des groupes de travail ont été établis pour:

- analyser les normes existantes
- créer une base de données de validation d'essais, et
- produire les recommandations consensuelles pour une procédure Européenne d'évaluation d'intégrité structurale.

Cette progression du travail du projet SINTAP implique la participation de plus de 30 organisations dans 13 pays européens. Le coordinateur est GKSS. Le projet est co-financé par la Commission Européenne dans le cadre du Programme Croissance du 5^{ème} Programme Cadre.

Des informations supplémentaires sur FITNET peuvent être trouvées sur le site Internet de réseau - www.eurofitnet.org.

Cette enquête

L'enquête vise à fournir la situation actuelle de la technologie "Aptitude au Service" ainsi que d'évaluer les priorités pour le développement d'un code européen de l'Aptitude au Service. Les résultats aideront le groupe FITNET à mieux diriger le programme du réseau thématique et à formuler de nouvelles actions de R&D. L'enquête est coordonnée par le Centre Commun de Recherche de la Commission Européenne (responsable du Groupe de Travail 2 de FITNET).

Instructions

Le questionnaire est composé des sections suivantes:

- type d'organisation
- utilisation de la technologie FFS
- besoins en formation
- priorités de R&D et outils de support
- dernières impressions et commentaires

Vous pourriez trouver utile de lire entièrement le questionnaire avant d'y répondre. La plupart des réponses peuvent être données simplement en cochant une case. Si vous ne souhaitez pas répondre à une question, vous pouvez la laisser ouverte. Il est souligné que cette enquête est confidentielle; aucune vue individuelle ne sera identifiée; aucune vue individuelle ne sera imputable dans le rapport dans lequel les résultats de ce questionnaire seront examinés. Les organisateurs de l'enquête prépareront un rapport résumant les résultats et les recommandations. Celui-ci sera distribué à toutes les organisations ayant répondu au questionnaire sous réserve que vos coordonnées apparaissent clairement dans la section 5.

Veuillez renvoyer le questionnaire complété dès que possible à l'adresse suivante:

Commission Européenne – DG CCR
Mme Patricia LEJUSTE
P.O. Box 2
NL –1755 ZG Petten
Fax: + 31.224.56 5623
Courrier électronique: Lejuste@jrc.nl

Votre coopération sera extrêmement appréciée. Toutefois, veuillez noter que les réponses doivent être reçues avant le **31 octobre 2002** afin de pouvoir être incluses dans l'évaluation.

Note: Veuillez nous excuser si vous avez reçu ce questionnaire plus d'une fois. Il nous a été impossible d'éviter un certain chevauchement dans les différentes listes d'adresses utilisées.

Enquête sur l'Aptitude au Service "Fitness-For-Service" (FFS)

Section 1: Type d'organisation

1. Dimension et type

- Votre organisation est-elle une multinationale? oui ☐ non ☐
- Dimension (nombre de personnes): moins de 50 ☐ 50 à 500 ☐ plus de 500 ☐
- Membre de FITNET? oui ☐ non ☐

2. Rôle de l'organisation

- Fabricant de composants ☐ Utilisateur ☐ Service d'ingénierie ☐
- R & D industriel ☐ Universitaire ☐ Institut de recherche ☐
- Organisme de contrôle/Autorité réglementaire ☐
- Autre (veuillez spécifier) _____

3. Domaine d'activité:

- Production d'énergie ☐ Pipelines ☐
- Aérospatiale ☐ Fournisseur de gaz ☐
- Transport terrestre ☐ Industrie des procédés ☐
- Pétrochimie ☐ Offshore ☐

Autre (veuillez spécifier) _____

Section 2: Utilisation de la technologie FFS

4. Votre organisation effectue-t-elle des évaluations FFS?

oui ☐

non ☐

5. À quel stade l'FFS est-elle effectuée?

Pendant la conception ☐

Après la fabrication c.-à-d. qualification pour mise en service ☐

En service (requalification, évaluation de durée de vie) ☐

6. Qui effectue l'FFS?

Ingénieurs internes ☐

Société extérieure ☐

7. Quelles procédures utilisez-vous pour les évaluations FFS?

Procédures: API 579 ☐ ETM ☐

BS 7910/PD 6493 ☐ A16 ☐

R5 ☐ SINTAP ☐

R6 ☐ ASME ☐

Autre (veuillez spécifier) _____

Dans le cas où vous êtes libre de choisir la procédure à utiliser:

- Laquelle des procédures ci-dessus choisiriez-vous? _____

- Pour quelle raison: accepté par l'Organisme Notifié ☐

procédure la plus familière ☐

procédure largement reconnue ☐

plus précise ☐

facile à utiliser ☐

Autre (veuillez spécifier) _____

8. Êtes-vous en faveur du développement d'un code européen FFS?

oui ☐

non ☐

9. Quelles sont les difficultés principales que vous rencontrez en effectuant des évaluations FFS?

	Pas de problèmes	Assez difficile	Très difficile
Estimation de la charge appliquée / historique du chargement exercé	☐	☐	☐
Modélisation de la rupture (fracture, effondrement, fluage)	☐	☐	☐
Propriétés des matériaux / historique thermique	☐	☐	☐
Disponibilité de personnel qualifié	☐	☐	☐
Analyse de contraintes	☐	☐	☐
Contraintes résiduelles	☐	☐	☐
Fiabilité NDE	☐	☐	☐
Complexité des règles	☐	☐	☐
Règles adéquates disponibles	☐	☐	☐
Autre (veuillez spécifier) _____	☐	☐	☐

10. Quelle évaluation de dommages est-elle la plus importante dans les évaluations globales FFS que vous effectuez?

évaluation de fracture statique %
évaluation d'effondrement plastique %
évaluation rupture par fluage %
évaluation de fatigue %
évaluation de corrosion %

11. Utilisez-vous un système informatisé pour soutenir les évaluations FFS?

oui ☐ quel logiciel(s) utilisez-vous: _____

Ce logiciel fournit-il:

- l'évaluation de fracture statique ☐
- évaluation d'effondrement plastique ☐
- évaluation rupture par fluage ☐
- évaluation de la fatigue ☐
- évaluation du fluage/durée de vie en fatigue ☐
- évaluation de corrosion ☐
- évaluation de contrôle en ligne ☐

Section 3: Besoins en formation

12. Y a-t-il un besoin de formation relative aux procédures FFS?

oui ☐

non ☐ (passez à la question 16)

13. Quel type de formation devrait être prioritaire (veuillez classer en 1^{ière}, 2^{ème} ou 3^{ème} position)?

application pratique des procédures _____
théorie et concepts de base _____
formation avancée – nouveaux développements dans les procédures _____

14. Quelle priorité accordez-vous aux formations FFS suivantes?

	Non prioritaire	Assez prioritaire	Haute priorité
Critères d'endommagements/modes de rupture	☐	☐	☐
Analyse des charges et des contraintes	☐	☐	☐
Inspection	☐	☐	☐
Contrôle d'état en ligne	☐	☐	☐
Caractéristiques des matériaux	☐	☐	☐
Concepts d'intégrité et d'évaluation de la durée de vie	☐	☐	☐
Autre (veuillez spécifier) _____	☐	☐	☐

15. Votre organisation serait-elle intéressée par les cours de formation FITNET?

oui ☐

non ☐

Si oui, - êtes vous particulièrement intéressé par:

la formation par logiciels ☐

des cours internes ☐

des "cours externes" – pourraient être tenus n'importe où ☐

- combien de temps ces formations pourraient-elles durer? _____

16. Devrait-il y avoir une qualification professionnelle pour la compétence dans l'application de la technologie FFS?

oui ☐

non ☐

Section 4: Priorités de R&D et outils de support

17. Votre organisation est-elle active dans le domaine de la R&D en ce qui concerne les méthodes FFS?

oui ☐

non ☐

18. Dans quels domaines effectuez-vous la R&D relative au FFS?

fracture ☐

fluage ☐

corrosion ☐

analytique ☐

fatigue ☐

fluage-fatigue ☐

techniques d'inspection ☐

évaluation de probabilité ☐

Autre (veuillez spécifier) _____

19. En termes de R&D pour des procédures améliorées d'FFS, veuillez classer ce qui suit dans l'ordre de priorité pour votre organisation

	Non prioritaire	Assez prioritaire	Haute priorité
Faisabilité améliorée d'analyse des contraintes	☐	☐	☐
Méthodes améliorées d'évaluation de charge	☐	☐	☐
Procédures améliorées de contraintes résiduelles	☐	☐	☐
Procédures améliorées d'évaluation de fracture	☐	☐	☐
Procédures améliorées d'évaluation de fatigue	☐	☐	☐
Procédures améliorées d'évaluation à hautes températures	☐	☐	☐
Procédures améliorées d'évaluation de corrosion	☐	☐	☐
Méthodes de probabilité	☐	☐	☐
Meilleures données sur les matériaux	☐	☐	☐
Meilleure définition de méthodes d'échantillonnage de matériaux	☐	☐	☐
Autre (veuillez spécifier): _____	☐	☐	☐

20. Quel type de support auriez-vous besoin pour promouvoir l'emploi de méthodes FFS?

Accès à l'expertise ☐

Outils logiciels ☐

Exemples type de vérification ☐

procédures générales ☐

outils de qualification ☐

Autre (veuillez spécifier) _____

Section 5: Dernières impressions et commentaires

21. Avez-vous des commentaires à formuler sur les sujets abordés dans ce questionnaire?

Merci d'avoir consacré un peu de votre temps pour remplir ce questionnaire!

Nous attendons avec intérêt de recevoir vos réponses avant le 31 octobre 2002

Afin de recevoir une copie de l'examen des réponses, veuillez indiquer vos coordonnées ci-dessous:

Nom:

Adresse:

.....

.....

.....

.....

Courrier électronique:

Umfrage zur gegenwärtigen Anwendung und zukünftigen Anforderungen der Europäischen Betriebstauglichkeitstechnologie (Fitness for Service, FFS)

Hintergrund:

Das thematische Netzwerk FITNET wurde im Februar 2002 gestartet, um die Entwicklung eines Europäischen Betriebstauglichkeitsverfahrens zum Bewerten der strukturellen Integrität lastübertragender metallischer Bauteile zu fördern. Insbesondere erfaßt es Methoden zur Behandlung der bekannten oder postulierten Defekte und berücksichtigt die Versagensmechanismen von Ermüdung, Bruch, Kriechen und umgebungsunterstützter Rissbildung. Das Netzwerk macht technologischen Fortschritt von neueren EU-finanzierten Projekten, nationalen Programmen und 'in-kind' Beiträgen nutzbar. Arbeitsgruppen sind eingesetzt worden, um:

- Übersichten zu bestehenden Normen zu erstellen
- eine Datenbank von Validierungstests zu schaffen, und
- einvernehmliche Empfehlungen für ein europäisches Integritätsbewertungsverfahren für Bauteile zu geben.

Es handelt sich hierbei um eine Fortsetzung der im Rahmen des SINTAP Netzwerks geleisteten Arbeit und involviert über 30 Organisationen aus 13 europäischen Ländern mit anerkanntem Fachwissen auf diesem Gebiet. Koordinator ist die GKSS, Geesthacht. Das Projekt wird von der Europäischen Kommission im Rahmen des FP5-Wachstumsprogramms teilfinanziert.

Weitere Informationen über FITNET finden Sie im Internet unter - www.eurofitnet.org.

Ziel der Umfrage

Die Umfrage zielt darauf ab, ein Bild des gegenwärtigen Status der Betriebstauglichkeitstechnologie zu liefern, sowie Prioritäten für die Entwicklung eines europäischen Betriebstauglichkeitsverfahrens zu evaluieren. Die Ergebnisse werden der FITNET-Gruppe helfen, das Programm des thematischen Netzwerks besser zu dirigieren sowie neue FuE-Aktionen zu formulieren. Die Umfrage wird von der Gemeinsamen Forschungsstelle der Europäischen Kommission koordiniert (Leiter des FITNET-Arbeitspakets 2).

Anleitung

Der Fragebogen besteht aus folgenden Teilen:

- Art Ihrer Organisation
- Nutzung von FFS-Technologie
- Fortbildungsbedürfnisse
- FuE-Prioritäten und Unterstützungsinstrumente
- Abschliessende Gedanken & Bemerkungen

Vielleicht ist es nützlich, zunächst den ganzen Fragebogen vor dem Beantworten zu lesen. Die meisten Antworten können mit einem einfachen Ankreuzen gemacht werden. Fragen, die Sie nicht beantworten möchten, lassen Sie einfach frei. An dieser Stelle soll betont werden, daß diese Umfrage vertraulich behandelt wird; keine einzelne Ansicht wird identifiziert werden können; keine einzelne Ansicht wird aus dem Bericht ersichtlich werden, in dem die Ergebnisse dieses Fragebogens diskutiert werden. Die Organisatoren dieser Umfrage werden einen Bericht verfassen, der die Ergebnisse und Empfehlungen zusammenfaßt. Dieser wird an alle antwortenden Organisationen, die Ihre Kontaktdaten in Abschnitt 5 angeben, verteilt werden.

Senden Sie bitte den ausgefüllten Fragebogen so bald wie möglich an:

GFS der GD der Europäischen Kommission

Frau Patricia LEJUSTE
P.O. Box 2
NL -1755 ZG Petten
Fax: + 31.224.56 5623
E-mail: Lejuste@jrc.nl

Wir bedanken uns im voraus für Ihre Mitarbeit. Nehmen Sie jedoch bitte zur Kenntnis, daß Antworten **vor dem 31. Oktober vorliegen müssen, um in den Bewertungsprozess mit einzugehen.**

Anmerkung: Entschuldigen Sie bitte, falls Sie diese Umfrage mehrmals erhalten. Es war uns leider unmöglich, eine Überschneidung in den verschiedenen verwendeten Verteilerlisten zu vermeiden.

Betriebstauglichkeit (FFS) Umfrage

Abschnitt 1: Art Ihrer Organisation

1. Größe und Typ

- Ist Ihre Organisation multinational? ja ☐ nein ☐
- Größe (Personalbestand): weniger als 50 ☐ 50 bis 500 ☐ mehr als 500 ☐
- FITNET-Mitglied? ja ☐ nein ☐

2. Art Ihrer Organisation

- Komponentenhersteller ☐ Endnutzer ☐ Maschinenbau ☐
 Industrielle FuE ☐ Universität ☐ Forschungsinstitut ☐
 Sicherheitsbehörde ☐ anderes (bitte spezifizieren) _____

3. Sektoren oder Tätigkeitsfelder:

- Stromerzeugung ☐ Rohrleitungen ☐
 Luftfahrt ☐ Gaslieferant ☐
 Bodentransport ☐ Verfahrensindustrie ☐
 Petrochemie ☐ Offshore ☐
 Sonstiges (bitte spezifizieren) _____

Abschnitt 2: Nutzung von FFS-Technologie

4. Führt Ihre Organisation FFS-Bewertungen aus?

Ja ☐

Nein ☐

5. Wann wird die FFS-Bewertung ausgeführt?

Während des Designs ☐

Nach der Fertigung d.h. Qualifizierung für Inbetriebnahme ☐

Während des Betriebes (Wiederbewertung, Lebensdauerabschätzung) ☐

6. Wer führt FFS-Bewertungen aus ?

Hausinterne Ingenieure ☐

Externes Unternehmen ☐

7. Welche Verfahren verwenden Sie für FFS-Bewertungen?

Angewendete Verfahren: API 579 ☐ ETM ☐

BS 7910/PD 6493 ☐ A16 ☐

R5 ☐ SINTAP ☐

R6 ☐ ASME ☐

Anderes (bitte spezifizieren) _____

In Situationen, in denen Sie frei wären, eines der o.g. Verfahren anzuwenden:

- Welches würden Sie von der oben genannten Liste wählen? _____

- Gründe für Wahl:

Von der Kontrollbehörde akzeptiert	☐
Ihnen am vertrautesten	☐
Überall anerkannt/bekannt	☐
Genauer	☐
Leicht anzuwenden	☐
anderer (bitte spezifizieren)	_____

8. Sind Sie für die Entwicklung eines europäischen FFS-Codes?

Ja ☐

Nein ☐

9. Was sind die Hauptschwierigkeiten, die Sie in der Ausführung von FFS-Bewertungen antreffen?

	Kein Problem	Mäßige Schwierigkeit	Hohe Schwierigkeit
Schätzung der aufgetragenen Last/Vorbelastung	☐	☐	☐
Versagensmodellierung (Bruch, Kollaps, Kriechen)	☐	☐	☐
Materialeigenschaften/thermische Vorbelastung	☐	☐	☐
Verfügbarkeit von erfahrenem Personal	☐	☐	☐
Lastanalyse	☐	☐	☐
Restspannungen	☐	☐	☐
ZfP-Zuverlässigkeit	☐	☐	☐
Komplexität der Regeln	☐	☐	☐
Verfügbare angemessene Regeln	☐	☐	☐
Sonstiges (bitte spezifizieren) _____	☐	☐	☐

10. Welche Schadensbewertung ist meist relevant in allen FFS-Bewertungen, die Sie ausführen?

statische Bruchbewertung	 %
plastischer Kollapsbewertung	 %
Kriechversagensbewertung	 %
Ermüdungsbewertung	 %
Korrosionsbewertung	 %

11. Verwenden Sie ein computergesteuertes System, um FFS-Bewertungen zu unterstützen?

Ja ☐ Welche(s) Softwareprodukt(e) verwenden Sie: _____

Liefert diese Software:

statische Bruchbewertung	☐
plastischer Kollapsbewertung	☐
Kriechversagensbewertung	☐
Ermüdungsbewertung	☐
Kriechen/Ermüdung Lebensdauerabschätzung	☐
Korrosionsbewertung	☐
Bewertung von on-line Überwachung	☐

Abschnitt 3: Fortbildungsbedürfnisse

12. Gibt es einen Bedarf an Fortbildung, die mit FFS-Verfahren zusammenhängt?

Ja ☐ Nein ☐ (springen Sie zu Frage 16)

13. Welche Art der Fortildung sollte Priorität genießen (Bewerten Sie bitte 1. , 2. , 3.)?

Praktische Anwendung von Verfahren _____
Grundlegende Theorie & Konzepte _____
Fortgeschrittenentraining –Neuentwicklungen von Verfahren _____

14. Welchen Vorrang räumen Sie im folgenden für FFS-Fortbildung ein?

	Niedrige Priorität	Mittlere Priorität	Hohe Priorität
Schadenskriterien/Versagensmechanismen	☐	☐	☐
Last und Spannungsanalyse	☐	☐	☐
Inspektion	☐	☐	☐
On-line Zustandsüberwachung	☐	☐	☐
Materialcharakteristik	☐	☐	☐
Konzepte der Integritäts- und Lebensdauerab- schätzung	☐	☐	☐
Sonstiges (bitte spezifizieren) _____	☐	☐	☐

15. Würde Ihre Organisation an FITNET-Fortbildungskursen interessiert sein?

Ja ☐ Nein ☐

Wenn ja,

- sind Sie insbesondere interessiert an:

Ausbildung durch Softwarepakete ☐
hausinternen Kursen ☐
"externen Kursen" –könnten irgendwo ☐
gehalten werden

- wie lang sollten diese Fortbildungskurse dauern? _____

16. Sollte es eine professionelle Qualifikation für die Befugnis zur Anwendung von FFS-Technologien geben?

Ja ☐ Nein ☐

Abschnitt 4: FuE-Prioritäten und Unterstützungsinstrumente

17. Ist Ihre Organisation aktiv in FuE für FFS-Methoden?

Ja ☐

Nein ☐

18. Auf welchen Gebieten führen Sie mit FFS zusammenhängender FuE aus?

Bruch	☐	Ermüdung	☐
Kriechen	☐	Kriech-Ermüdung	☐
Korrosion	☐	Inspektionsmethoden	☐
Analyse	☐	Wahrscheinlichkeitsbewertung	☐
Sonstiges (bitte spezifizieren) _____			

19. Im Hinblick auf FuE für verbesserte FFS-Verfahren: Reichen Sie bitte folgendes in Prioritätsstufen für Ihre Organisation ein

	Niedrig Priorität	Medium Priorität	Hoch Priorität
Verbesserte Durchführbarkeit von Belastungsanalysen	☐	☐	☐
Verbesserte Ladungsbewertungsmethoden	☐	☐	☐
Verbesserte Restspannungsbewertungsverfahren	☐	☐	☐
Verbesserte Bruchbewertungsverfahren	☐	☐	☐
Verbesserte Ermüdungsbewertungsverfahren	☐	☐	☐
Verbesserte Bewertungsverfahren für hohe Temperatur	☐	☐	☐
Verbesserte Korrosionsbewertungsverfahren	☐	☐	☐
Wahrscheinlichkeitsmethoden	☐	☐	☐
Bessere Materialdaten	☐	☐	☐
Besser definierte Probenentnahmemethoden	☐	☐	☐
Sonstiges (bitte spezifizieren): _____	☐	☐	☐

20. Welche Art von Unterstützung ist erforderlich, um die Nutzung von FFS- Verfahren zu fördern?

Zugang zu Fachwissen	☐	allgemeine Verfahren	☐
Software-Tools	☐	Qualifikationsinstrumente	☐
Kontrollfälle	☐	anderes (bitte spezifizieren) _____	

Abschnitt 5: Abschliessende Gedanken & Bemerkungen

21. Haben Sie irgendwelche Bemerkungen zu den Fragen, die in diesem Fragebogen gestellt wurden?

Vielen Dank, dass Sie sich die Zeit genommen haben, um diesen Fragebogen auszufüllen!

Wir freuen auf das Erhalten Ihrer Antworten bis zum 31. Oktober 2002

Um eine Kopie der Antwortübersicht zu erhalten, geben Sie bitte Ihre Kontaktdaten an:

Name:

Kontaktadresse:

.....

.....

.....

.....

E-mail:

Felmérés az Európai Üzemelésre Való Alkalmasság értékelésére (Fitness-For-Service -FFS) vonatkozó eljárások jelenlegi alkalmazásáról és a jövőbeli elvárásokról

Előzmények:

A FITNET tematikus hálózati projekt 2002 februárjában indult azzal a céllal, hogy elősegítse egy egységes Európai üzemelésre való alkalmasság értékelésére vonatkozó eljárás kifejlesztését, melynek célja a mechanikai terhelésnek kitett fémszerkezetek integritásának értékelése. Nevezetesen olyan technikákat foglal magában, melyek a feltárt vagy feltételezett hibákkal foglalkoznak, és lehetséges tönkremeneteli módokként figyelembe veszi a kifáradást, rideg-törést, kúszást és a környezeti hatás által előidézett törést. A hálózat hasznosítja az EU által támogatott illetve nemzeti kutatási projektek legújabb eredményeit, és természetbeni hozzájárulásokat is. A következő munkacsoportokat alakították:

- meglévő szabványok felülvizsgálatára,
- érvényességi vizsgálatok adatbázisának létrehozására, valamint
- közösen elfogadott ajánlások készítésére egy Európai szerkezet-integritást értékelő eljárásra vonatkozóan.

Ez a SINTAP projekt eredményeinek egyfajta továbbfejlesztése és 13 Európai országból több mint 30 intézmény vesz részt a projektben –valamennyi ismert és szakmailag elismert intézet ezen a területen. A projekt koordinátora a GKSS (Németország). A projektet részben támogatja az Európai Bizottság az FP5 Growth Program keretében.

A FITNET-re vonatkozóan további információk a következő honlapon találhatók: www.eurofitnet.org.

Jelen felmérés

A felmérés célja, hogy képet kapjunk a „fitness-for service”-FFS technológia jelenlegi helyzetéről és hogy értékeljük egy Európai „fitness-for service” kód kidolgozására vonatkozó prioritásokat. Az így kapott eredmények segítséget nyújtanak a FITNET csoport számára a tematikus hálózat programjának hatékonyabb irányításában, valamint új kutatás-fejlesztési tevékenységek elindításában. A felmérést az Európai Bizottság Egyesült Kutatási Központja (JRC, Petten) irányítja (FITNET Work Package 2 vezetője).

Instrukciók

A kérdőív a következő fejezetekből áll:

- Szervezet adatai
- FFS technológia alkalmazása
- Oktatási igények
- Kutatás-Fejlesztési prioritások és támogatási eszközök
- Záró gondolatok és megjegyzések

Hasznos: Kérjük olvassa el a teljes kérdőívet, mielőtt válaszolna a feltett kérdésekre. A legtöbb választ egyszerűen csak kiválasztással kell megadni. Amennyiben van olyan kérdés, amelyikre nem óhajt válaszolni, kérjük hagyja üresen. Fontos, hogy jelen kérdőív szigorúan bizalmas; egyetlen egyéni vélemény sem kerül azonosításra, egyetlen egyéni véleményt sem tulajdonítjuk el a jelentésben, amelyben e kérdőív eredményeit foglaljuk össze és értékeljük. A felmérés szervezői készítenek egy jelentést, amely összegzi az eredményeket és ajánlásokat. Ez valamennyi olyan szervezetnek megküldésre kerül, amelyik kitölti a kérdőívet és megadja a kapcsolattartó személy adatait a kérdőív 5. pontjában.

Kérem a lehető leghamarabb küldje vissza a kitöltött kérdőívet a következő címre:

Európai Bizottság DG JRC
Mrs. Patricia LEJUSTE
P.O. Box 2
NL – 1755 ZG Petten
Fax: +31.224.56 5623
Email: Lejuste@jrc.nl

Együttműködését előre is köszönjük. Azonban kérjük figyelembe venni, hogy a válaszoknak **2002. Október 31-ig meg kell érkeznie, hogy a feldolgozásnál figyelembe tudjuk venni.**

Fontos: Szíves elnézését kérjük, amennyiben többször is megkapná jelen felmérést. Lehetetlen volt elkerülni az átfedéseket a felhasznált, különböző forrásokból származó levelezési listákban.

Fitness-For-Service (FFS) Felmérés

1. Fejezet: Szervezet Típusa

1. Méret és Típus

- Az Ön szervezete multinacionális? Igen ☐ Nem ☐
- Méret (összes dolgozó): kevesebb mint 50 ☐ 50 és 500 között ☐ több mint 500 ☐
- FITNET tag e? Igen ☐ Nem ☐

2. A Szervezet szerepe

- | | | |
|---|---|---|
| Alkatrészgyártás ☐ | Végfelhasználó ☐ | Műszaki szolgáltatások ☐ |
| Ipari kutatás-fejlesztés ☐ | Egyetem ☐ | Kutató Intézet ☐ |
| Biztonsági hatóság ☐ | Egyéb (kérjük megadni) _____ | |

3. A tevékenység szektorai vagy területei

- | | |
|---|---|
| Energiatermelés ☐ | Csővezetékek ☐ |
| Úrrepülés ☐ | Gázellátás ☐ |
| Felszíni szállítás ☐ | Feldolgozó ipar ☐ |
| Petrokémiai ☐ | Offshore (tengeri) ☐ |
| Egyéb (kérjük megadni) _____ | |

2. Fejezet: FFS Technológia alkalmazása

4. Végez-e az Ön intézménye FFS (üzemelésre való alkalmasság) értékeléseket?

Igen ☐

Nem ☐

5. Mikor történik az FFS értékelés?

Tervezés közben ☐

Gyártást követően, pl.: üzemelésre történő minősítés ☐

Üzemelés közben (újra-minősítés, élettartam értékelés) ☐

6. Ki végzi az FFS értékeléseket?

Szervezetén belüli mérnökök ☐

Külső vállalat ☐

7. Melyik eljárást alkalmazza az FFS értékelésekhez?

Alkalmazott eljárások: API 579 ☐

BS 7910 / PD 6493 ☐

R5 ☐

R6 ☐

Egyéb (kérjük megadni) _____

ETM ☐

A16 ☐

SINTAP ☐

ASME ☐

Azokban az esetekben, amikor szabadon választhatja ki az alkalmazni kívánt eljárást:

- Melyiket választaná a fent említett listából? _____

- A választás indokai:

Hivatalos szerv által elfogadott ☐

Legismertebb az Ön számára ☐

Széles körben elismert/ismert ☐

Pontosabb ☐

Könnyű használni ☐

Egyéb (kérjük megadni) _____

8. Támogatja-e egy Európai FFS eljárás kifejlesztését?

Igen ☐

Nem ☐

9. Milyen főbb nehézségekkel találkozott az FFS értékelések során?

	Nincs Probléma	Mérsékelt Nehézség	Jelentős Nehézség
Alkalmazott terhelés / terhelés-történet meghatározása	☐	☐	☐
Tönkremenetel modellezése (törés, képl.összeomlás, kúszás)	☐	☐	☐
Anyagtulajdonságok / termikus előélet meghatározása	☐	☐	☐
Szakképzett munkatársak	☐	☐	☐
Feszültség elemzés	☐	☐	☐
Maradó feszültségek meghatározása	☐	☐	☐
Roncsolásmentes vizsgálatok megbízhatóság	☐	☐	☐
Szabályok bonyolultsága	☐	☐	☐
Megfelelő szabályok rendelkezésre állása	☐	☐	☐
Egyéb (kérjük megadni) _____	☐	☐	☐

10. Melyik károsodás-értékelés a leggyakoribb az Ön által végzett átfogó FFS értékelésekben?

statikus törés értékelése	 %
képlékeny összeomlás értékelése	 %
kúszásos tönkremenetel értékelése	 %
kifáradás értékelése	 %
korrózió értékelése	 %

11. Használ e számítógépesített rendszert az FFS értékelések támogatására?

Igen ☐ Melyik szoftver terméke(ke)t használja: _____

Ezen szoftver készí-e:

statikus törés értékelést	☐
képlékeny összeomlás értékelést	☐
kúszásos tönkremenetel értékelést	☐
kifáradási értékelést	☐
kúszás / kifáradás élettartam értékelést	☐
korrózió értékelést	☐
értékelést On-line ellenőrzés alapján	☐

3. Fejezet: Oktatási Igények

12. Van-e szükség az FFS eljárásokkal kapcsolatos oktatásra?

Igen ☐ Nem ☐ (folytassa a 16. kérdéssel)

13. Milyen típusú oktatást tart a legfontosabbnak (kérem, rangsorolja a következőket fontossági sorrendben 1,2,3)?

Az eljárások gyakorlati alkalmazása _____
 Alapvető elméleti ismeretek és fogalmak _____
 Haladó szintű oktatás – legújabb fejlesztések az eljárásokban _____

14. Milyen prioritásokat ad a következő témaköröknek?

	Alacsony prioritás	Közepes prioritás	Magas prioritás
Károsodási kritérium/tönkremeneteli módok	☐	☐	☐
Terhelés- és feszültség analízis	☐	☐	☐
Felülvizsgálat	☐	☐	☐
On-line állapot-ellenőrzés	☐	☐	☐
Anyagjellemzők	☐	☐	☐
Integritás és élettartam értékelési koncepciók	☐	☐	☐
Egyéb (kérjük megadni) _____	☐	☐	☐

15. Az Ön szervezete érdeklődne-e FITNET oktatási tanfolyamok iránt?

Igen ☐ Nem ☐

Amennyiben igen,

- érdeklik-e kiemelten a következők:

oktatás szoftver-csomagok segítségével ☐
 vállalaton belül zajló tanfolyamok ☐
 "külső tanfolyamok" –bárhol megtarthatók ☐

- milyen hosszúak legyenek a tanfolyamok _____

16. Szükség lenne-e szakképesítésre az FFS technológia alkalmazásához?

Igen ☐ Nem ☐

4. Fejezet: Kutatás-fejlesztési Prioritások és Támogatási Eszközök

17. Részt vesz-e az Ön intézménye kutatás-fejlesztési tevékenységben az FFS eljárásokkal kapcsolatban?

Igen ☐

Nem ☐

18. Mely területeken végez FFS-hez kapcsolódó kutatás-fejlesztést?

Törés ☐

Kifáradás ☐

Kúszás ☐

Kúszás-fáradás ☐

Korrózió ☐

Vizsgálati technikák ☐

Analitikai módszerek ☐

Valószínűségi értékelés ☐

Egyéb (kérjük részletezni): _____

19. Kérem rangsorolja a korszerű FFS eljárásokra vonatkozó kutatás-fejlesztés szempontjából a következőket fontossági sorrendben

	Alacsony Prioritás	Közepes Prioritás	Magas Prioritás
Feszültség-analízis továbbfejlesztett megvalósíthatósága	☐	☐	☐
Továbbfejlesztett terhelés-értékelési eljárások	☐	☐	☐
Továbbfejlesztett maradó feszültség értékelő eljárások	☐	☐	☐
Továbbfejlesztett törés-értékelési eljárások	☐	☐	☐
Továbbfejlesztett kifáradás-értékelési eljárások	☐	☐	☐
Továbbfejlesztett nagy hőmérsékletű értékelési eljárások	☐	☐	☐
Továbbfejlesztett korrózió értékelési eljárások	☐	☐	☐
Valószínűség-elméleti alapú eljárások	☐	☐	☐
Jobb anyagadatok	☐	☐	☐
Jobban definiált anyag-mintavételi eljárások	☐	☐	☐
Egyéb (kérjük megadni): _____	☐	☐	☐

20. Milyen típusú támogatásra van szüksége az FFS eljárások alkalmazásának elősegítése érdekében?

Hozzáférés szakvéleményhez ☐

Általános eljárások ☐

Szoftver eszközök ☐

Minősítési eszközök ☐

Esettanulmányok ☐

Egyéb (kérjük megadni): _____

5. Fejezet: Záró Gondolatok & Megjegyzések

21. Van-e valamilyen észrevétele, megjegyzése a jelen kérdőívben érintett témákkal kapcsolatban?

Köszönjük, hogy időt szakított ezen kérdőív kitöltésére!

Várjuk válaszaikat 2002. Október 31-ig

Amennyiben másolatot szeretne a Válaszok Áttekintéséről, kérjük adja meg elérhetőségét:

Név:

Értesítési cím:

.....

.....

.....

.....

E-mail cím:

Indagine sui modi correnti di valutazione d'idoneità al servizio (FFS) e sulle future esigenze per una tecnologia Europea nel settore.

Premessa:

La rete tematica FITNET è stata lanciata nel mese di febbraio 2002 per promuovere lo sviluppo di una procedura Europea di Idoneità al servizio (Fitness for Service), atta a valutare l'integrità di strutture metalliche trasmettenti un carico. In particolare, la rete copre le tecniche per trattare i difetti noti o presunti, ed intende considerare i cedimenti per fatica, rottura, scorrimento viscoso (creep) ed environmental assisted cracking. La rete si basa sui recenti progressi tecnologici derivanti da progetti finanziati dalla CE, da programmi nazionali e da collaborazioni su fondi propri (Contribution-in Kind). Sono stati formati dei gruppi di lavoro coi compiti che seguono:

- revisione delle norme esistenti
- creazione di un database di prove di validazione, e
- redazione di raccomandazioni per una Procedura Europea di Valutazione d'Idoneità al Servizio,

FITNET rappresenta il proseguimento del lavoro di SINTAP. E' basato sulla collaborazione di 30 organizzazioni di 13 paesi europei, tutte di riconosciuta competenza nel settore. Il coordinatore è GKSS. Il progetto è parzialmente finanziato dalla Commissione Europea nell'ambito del programma "Crescita" del quinto Programma Quadro di Ricerca e Sviluppo (R&S).

Ulteriori informazioni su FITNET sono disponibili sul sito web - www.eurofitnet.org.

Quest'indagine

L'indagine punta a fornire un quadro dello stato attuale della tecnologia di valutazione d'idoneità al servizio, e a valutare le priorità per lo sviluppo di un codice Europeo sull'argomento. I risultati aiuteranno il gruppo FITNET a meglio dirigere il programma della rete tematica, e a formulare nuove azioni di R&S. L'indagine è coordinata dal Centro Comune di Ricerca della Commissione Europea (Coordinatore del pacchetto del lavoro FITNET 2).

Istruzioni

Il questionario è composto delle seguenti sezioni:

- tipo di organizzazione
- utilizzo della tecnologia di valutazione di idoneità al servizio
- esigenze di formazione
- priorità in termini di R&S e strumenti di supporto
- pensieri & osservazioni finali

Potrebbe esservi utile leggere l'intero questionario prima di rispondere. La maggior parte delle risposte può essere fornita con un semplice tratto su una casella. Se non desiderate rispondere ad alcune domande, semplicemente lasciate vuote le caselle corrispondenti. Si sottolinea che quest'indagine è confidenziale; nessun singola opinione verrà evidenziata, né sarà riconoscibile nella relazione nella quale i risultati di questo questionario saranno discussi. Gli organizzatori dell'indagine redigeranno una relazione che riassume i risultati e le raccomandazioni, e che sarà distribuita a tutte le organizzazioni che avranno inviato una risposta.

Vi preghiamo di restituire il questionario compilato non appena possibile a:

DG CCR della Commissione Europea
Sig.ra Patricia LEJUSTE
P.O. Box 2
NI -1755 ZG Petten
Fax: + 31.224.56 5623
Indirizzo di posta elettronica: Lejuste@jrc.nl

La vostra cooperazione è estremamente apprezzata. Vi preghiamo tuttavia di notare che, **per essere incluse nel processo di valutazione**, le risposte devono essere ricevute entro il **31 ottobre 2002**

Nota: Qualora abbiate ricevuto questo questionario più di una volta, vi preghiamo di accettare le nostre scuse. È stato impossibile evitare qualche sovrapposizione nei diversi elenchi di indirizzi utilizzati.

Sezione 1: tipo dell'organizzazione

Sezione 2: utilizzo di tecnologia FFS

4. la vostra organizzazione esegue valutazioni FFS?

Sì ☐

No ☐

5. quando viene eseguita la valutazione FFS?

Durante la progettazione ☐

Dopo la manifattura, cioè come qualificazione per servizio ☐

Durante il servizio (ri-valutazione, valutazione di vita) ☐

6. chi conduce le valutazioni FFS?

Ingegneri interni ☐

Società esterna ☐

7. quali procedure seguite per le valutazioni FFS?

Procedure applicate: api 579	☐	ETM	☐
BS 7910/PD 6493	☐	A16	☐
R5	☐	SINTAP	☐
R6	☐	ASME	☐
altro (per favore precisate)		_____	

Essendo liberi di scegliere la procedura da applicarsi:

- Quale scegliereste dall'elenco di cui sopra? _____

- Ragioni per la Vs. scelta:	e' accettata da un Organismo Notificato	☐
	vi e' più familiare	☐
	e' ampiamente riconosciuto/noto	☐
	e' più preciso	☐
	e' di facile impiego	☐
	altro (per favore precisate)	_____

8. siete a favore dello sviluppo di un codice europeo FFS?

Sì ☐

No ☐

9. quali sono le difficoltà principali che incontrate nell'esecuzione delle valutazioni FFS?

	Nessun Problema	Difficoltà Moderate	Notevoli Difficoltà
Stima del carico applicato/ storia del carico	☐	☐	☐
Modellazione del cedimento (frattura, crollo, scorrimento viscoso)	☐	☐	☐
Proprietà dei materiali/storia termica	☐	☐	☐
Mancanza di personale specializzato	☐	☐	☐
Analisi di stress	☐	☐	☐
Stress residui	☐	☐	☐
Affidabilità NDE	☐	☐	☐
Complessità delle regole	☐	☐	☐
Disponibilità di regole adeguate	☐	☐	☐
Altro (per favore precisate) _____	☐	☐	☐

10. quale valutazione di danno è più pertinente nel quadro globale delle valutazioni FFS che eseguite?

valutazione statica di rottura	 %
valutazione di cedimento plastico	 %
valutazione di cedimento per scorrimento viscoso	 %
valutazione di fatica	 %
valutazione di corrosione	 %

11. in supporto alle valutazioni FFS, utilizzate un sistema computerizzato?

Sì ☐ quale prodotto(i) software utilizzate: _____

Questo software dà:

valutazione statica di frattura	☐
valutazione di cedimento plastico	☐
valutazione di cedimento per scorrimento viscoso (creep)	☐
valutazione di fatica (fatigue)	☐
valutazione di vita in condizioni di creep/fatigue	☐
valutazione di corrosione	☐
valutazione da controllo on-line	☐

Sezione 3: esigenze di formazione

12. esistono esigenze di formazione relativamente alle procedure FFS?

Sì ☐ No ☐ (andate alla domanda 16)

13. a quale tipo di formazione dovrebbe essere data priorità (per favore indicate 1^a, 2^a, 3^a)?

Applicazione pratica di procedure _____
teoria & concetti di base _____
formazione avanzata – recenti innovazioni delle procedure _____

14. quale priorità date alle seguenti voci in termini di formazione FFS?

	Bassa Priorità	Media Priorità	Alta Priorità
Criteri di danno/modi di cedimento	☐	☐	☐
Carichi ed analisi di stress	☐	☐	☐
Ispezione	☐	☐	☐
Controllo on-line delle condizioni	☐	☐	☐
Caratteristiche dei materiali	☐	☐	☐
Concetti relativi alla valutazione d'integrità e di vita	☐	☐	☐
Altro (per favore precisate) _____	☐	☐	☐

15. la vostra organizzazione si interessa ai corsi di formazione FITNET?

Sì ☐ No ☐

Se sì,

- siete in particolare interessati a:

formazione attraverso pacchetti software ☐
corsi di formazione interni ☐
"corsi esterni" (potrebbero essere tenuti dovunque) ☐

- quanto tempo questi corsi di formazione dovrebbero durare? _____

16. dovrebbe esserci una qualifica professionale di competenza nell'applicazione di tecnologia FFS?

Sì ☐ No ☐

Sezione 4: priorità di R&S e strumenti degli aiuti

17. la vostra organizzazione svolge attività di R&S sui metodi FFS?

Sì ☐

No ☐

18. in quali settori eseguite R&S sulla FFS?

Frattura ☐

Scorrimento viscoso (creep) ☐

Corrosione ☐

Analitico ☐

Altro (per favore precisate) _____

fatica(fatigue) ☐

Creep-fatigue ☐

Tecniche d'ispezione ☐

Valutazione probabilistica ☐

19. in termini di R&S a favore di migliori procedure FFS, vogliate indicare l'ordine di priorità che i seguenti elementi hanno per la vostra organizzazione

	Bassa Priorità	Media Priorità	Alta Priorità
Migliore fattibilità d'analisi di stress	☐	☐	☐
Migliori metodi di valutazione del carico	☐	☐	☐
Migliori procedure per gli stress residui	☐	☐	☐
Migliori procedure di valutazione di frattura	☐	☐	☐
Migliori procedure di valutazione di fatica	☐	☐	☐
Migliori procedure di valutazione dell'alta temperatura	☐	☐	☐
Migliori procedure di valutazione di corrosione	☐	☐	☐
Metodi probabilistici	☐	☐	☐
Migliori dati sui materiali	☐	☐	☐
Miglior definizione dei metodi di campionamento di materiali	☐	☐	☐
Altro (per favore precisate): _____	☐	☐	☐

20. quale tipo di supporto è necessario?

Accesso a competenze ☐

Strumenti software ☐

Casi di verifica ☐

Procedure generali ☐

Strumenti di qualificazione ☐

altro (per favore precisate) _____

Sezione 5: pensieri & osservazioni finali

21. avete osservazioni sulle domande poste nel presente questionario?

Grazie di aver trovato il tempo per compilare questo questionario!

Restiamo in attesa di ricevere le vostre risposte entro il 31 ottobre 2002

Per ricevere una copia del rapporto su questa indagine vogliate cortesemente indicare le vostre coordinate.

Nome:

Indirizzo:

.....

.....

.....

.....

Indirizzo di posta elettronica: