

IIW-V-970-91

Reliability of Magnetic and Liquid penetrant Inspection

by P. Kauppinen and J. Sillanpää

This report presents the results of a round robin exercise flaw detectability by liquid penetrant and magnetic particle testing methods. About 133 test specimens (67 in ferritic steel, 33 in austenitic steel and 33 in aluminium) were examined by about 14-16 different teams. The specimens had round, linear and non-relevant indications. Results of the round robin exercise indicate that liquid penetrant method is most sensitive to rounded defects while magnetic particle methods can reveal reliably linear discontinuities and cracks. Further use of coloured chemical and certified operators lead to higher probability of detection especially smaller defects. However the report concludes that overall, surface inspection methods have poor reliability as they could detect less than 50% of cracks and 70% of rounded defects exceeding the acceptance limit specified in NB-5300 of ASME code section III.

V-969-91

Reliability of Radiography and Ultrasonic testing

This report presents the results of a round robin radiographic and ultrasonic weld examination as per IIW. ISO based procedures. The test specimens were butt-welded plates and pipes in C-Mn mild steel with wall thickness upto 25 mm and TK joints and butt welds in thicker plates upto 50 mm. The specimens contained a variety of weld defects as porosities. Slag inclusions, incomplete penetration, lack of fusion cracks etc totalling with defect heights ranging upto 13 mm. About 4600 ultrasonic and 3400 radiographic examinations performed reveal that the probability of detection for sharp/planar defects is higher for ultrasonic while for volumetric defects radiography is best suited.

V-945-91

An Image Quality Indicator Design for Use with high Penetrating Radiation

by T.A. Stewart and M.W. Austin

In this report, a new image quality indicator design has been proposed by the authors. The IQI designed is a steel strip with a cross-section of 0.07 mm by 3 mm. When the greater cross-sectional dimension is oriented parallel to the beam, the strip cross-section provides a narrow step function response in attenuation. Thus using the intensity profile across the radiographic image and using the relationship for geometric unsharpness, one can easily determine the focal spot size on an X-ray tube. Apart from determining the spatial resolution of the X-ray high energy sources. The authors also suggests the use of this IQI for determination of L/D ratio of neutron beams.

V-962-91

Control of Film Processing by Means of reference values

This report describes a procedure for the control of film processing systems either automatic or manual, using calibrated pre-exposed strips. The parameters considered for the evaluation of the processing system are based on fog density, Speed index and contrast index. The authors briefly described the experimental procedures for the measurement of these parameters which indicates the conditions of the developer (mainly) and fixer. A format for the presentation of results is also suggested.

V-963-91

Quantitative Measurement of Imaging Properties

This document gives the guidelines for quantitative measurement of imaging properties of radioscopic systems comprising of an X-ray source, radiation conversion device, image processor (optional) and a display unit. The authors have briefly described the procedures for the measurement of sharpness, contrast, wall thickness range and linearity of the conversion device. For the measurement of image quality of the display unit and image processor, an experimental setup using a bar pattern has been suggested. The note also includes the definitions of some of the terms used in the paper to denote the image quality parameters. A format for presenting the results obtained is also included.

V-964-91

Qualitative Control and Long Term Stability of Imaging Devices.

This document gives the guidelines for on-site inspection of radioscopic system comprising of an X- or gamma ray source,

V-955-91

ISO/TC 176 Quality Management and quality assurance "Vision 2000" - A strategy for individual standards implementation in the quality arena during the 1990's.

ISO TC 176 was established in 1979. This report reflects the position at the time of the meeting in Interlaken in October, 1990 and the progress of the work in the following months.

Annex A of the document illustrates the scope and committee structure. Annex B summarises the allocated secretariat assignments of TC 176 standard numbers, whereas Annex 'C' establishes the link to Vision 2000.

Trends, concerns for TC 176, product categories, Industry/Economic sectors, goals, strategy, the expectations for the year 2000 are summarised in Annex 'D'. Annex 'E' shows the tasks and targets of the revisions and provides details on task

distribution among the active member countries and on the persons involved.

ISO recommendations have been made to investigate the desirability and options to harmonize a series of standards passed by national countries with relevant ISO guides and to transform the results into international standards. This is dealt in Annex 'F'.

Annex 'G' confirms the extreme importance of the European standardization work as well as the possibility of achieving a global introduction of European standards and thus harmonization of worldwide scale.

Eapid acceptance of Draft international standards (ISO/DU) in the national standardization is given in Annex 'H'.

Annex 'I' deals with first summarized revision of quality terms and definitions as committee draft-ISO/CD 8402-1. Annexes 'J' and 'K' deal with quality management and quality system elements Annex 'L' gives the systems approach to the economics of Quality. Dependability management is discussed in Annex 'M'.

V-958-91

Quality policies and standardisations in Brazil for Welded constructions.

by Brazilian Delegation.

Until 1990, Brazilian companies had to work with several quality systems at the same time to satisfy the different requirements of different clients.

There was no official Brazilian code for welded constructions, companies must work according to several codes like ASME, BS, API,AWS.

In November, 1990, the Brazilian government announced a new policy for the quality and productivity of Brazilian products and services.

This document detail with the new industrial strategy, market restrictions, quality system, standardisation, motivation for quality and productivity, training programmes and certification of laboratories.

V-957-91

ISO/CEN "STATE OF THE ART" related to welding Technology in Quality Assurance. Inspection and Personnel Qualification.

This European draft standard replaces various earlier drafts. This draft standard provides general principles for the supervision of welding both in the workshop and on site. The future EN standard will serve the purpose of providing evidence that a manufacturer is capable of producing welded components in the pre-determined quality. The details about "qualification and Certification of NDT personnel is dealt by ISO/DIS 9712, and is given in the document.

V-952-92 /VF-178-91

Sub commission VF - Annual Report, 1991.

by Birger Hansen

The fitness for purpose of welded structures document IIW/IIS-SST-1157-90 has been printed during the year. A list of all members of sub commission VF is included in the document.

V-951-91

Sub commission VE - Annual Report, 1990-91

by Chairman Paul Holler

Working party for eddy current modelling had discussed the current and future work and the objects for modelling were changed to austenitic claddings.

One document on the characterization of black - light lamps and liquid penetrants was prepared for publication and presented in the 91 - annual assembly.

The working party for the residual stress measurements in welds had agreed not to update the IIW handbook (VE 847-87) since there is no necessity for this. It has been agreed that the hand book can be published by the American Welding Society.

V-959-91

Failure Mode and Effect Analysis (FMEA) in Welded Constructions

by Brazillian Delegation

The rate of quality assurance in Engineering Companies has chnaged. Its activities are no longer restricted to product inspection and testing, but the main objective is to prevent potential errors as early as possible. The application of analytical techniques to design, manufacture and quality control is becoming popular, It has been identified that failure mode and effect analysis is a very powerful technique to integrate the many factors involved and to review the design, manufacture and quality control aspects. The basic objective of a failure mode and effect analysis is to prevent inservice failures.

This document deals with the approach of the Analysis. The whole analysis is divided into parts like (a) Structure of data (b) FMEA technique which consists of situation analysis, risk prediction and prevention priority.

V-960-91

Economic Advantages of CAQ demonstrated by the example of a company specialised in the manufacture of welded stainless tubes.

The amount of necessary documentation in the area of quality assurance is increasing continuously, hence economical aspects and customers demand more and more for the application of computer aided quality (CAQ) in this area.

Thid document deals with the some practical experiences with a CAQ system, installed in a production line for longitudinal welded stainless steel tubes and especially with the economical advantages achieved by the systematic application of this system

all over the whole area of quality assurance. Besides the advantages of increased quality, increased transparency of quality information all over the production, quick information about the status of orders and repair work and quick creation of final inspection certificates, a high reduction of costs could be achieved by the application of the installed CAQ System.

V-954-91

Working group 3 of IIW Commission V "Quality Assurance in Welding Technology" - Annual Report-1990-91.

This document deals with the number of European directives governing new European standards. One of the main objective of WG 3 is to follow this new development and to report on the "Status quo" with emphasis on the subject of harmonisation in Quality.

During the period of report, progress was made on the development of new standards and revisions of the 9001/9002/9003 series in order to contribute readily acceptable standards to further European standardisation.

It was emphasised to collect more data on the following topics :

- On line inspection/monitoring
- QA and the human factor
- Fit for purpose evaluation with special emphasis on welded compound analysis for life extension and
- Failure mode and Effect Analysis (FMEA) in Welded structures.

Annex 'D' of the document gives the membership list.

IIW-V-967-91

Development and optimization of NDT for practical use - NORD TEST NDT PROGRAMME - Project Presentation.

In this document, a review is given of the Nordtest NDT programme including the projects technical content, organization, funding as well as results achieved and experience gained. In the Nordtest NDT programme conducted between 1984 - 1990, topics covered have been optional use of NDT and NDT results, reliability trials of commonly applied techniques, assessment of techniques and preparation of a handback for defect sizing, the impact of computers and computing on NDT.

The technical contents of Nordtest NDT programme consists of the following parts :

- Optical use of NDT and NDT results
- Defect detection probabilities for different NDT techniques
- Defect sizing and type estimation and
- Handling and documentation of NDT results

The results of the Nordtest NDT programme and the experience gained are summarized in the document.

V-949-91

Annual Report of Sub Commission Va for 1991.

This document deals with the activities of Sub Commission VA during 1991. The paper "ROC - study of inspection performance in radiographic testing of welded joints" by Heidt, Nockman, Thomson was accepted for application. Part I a film system classification standard was accepted and proceeded by the annual assembly of commission V in Montreal.

The working party "Radioscopic systems for weld inspection" was very active during this period to produce the final additions of Part 1 and 2 of the standard proposal.

The working party "radiographic acceptance criteria for weld inspection" finished its work with a publication about the reliability of radiographic weld inspection.

The future work of sub Commission VA will concentrate on the fields of standardization and test reliability.

V-966-91

Comparison of Ultrasonic Echo and Thermal Inspection methods.

by V.A. Troitskii & V.I. Zagrebely

This document deals with problems concerning inspection of adhesion strength of protective and strengthening thermal - sprayed and clad coatings by the ultrasonic and thermal methods. These methods are compared on the basis of theoretical and experimental studies. The experimental studies on specimens having defects show good agreement between the results of both inspection methods. The advantages drawbacks and applications of these methods are described.

V-950-91/OE

Submission VC Annual report - 1990/91.

This document contains the report of the intermediate meetings of Sub-Commission VC. The future work (planned) of subcommission V consists of the following :

Validation of ultrasonic techniques for Weld Inspection.

Characterization of ultrasonic probes for Weld Inspection.

Preparation of a revised manual for the ultrasonic inspection of ferritic welds.

Modern imaging techniques for automatic ultrasonic inspection methods and their importance for the weld inspection.

IIW-V-971-91

Reliability optimisation of manual ultrasonic weld inspection

The round robin program (1983-86) conducted by Dutch Welding Institute on a series of butt welded test plates revealed that by manual ultrasonics the correct rejection rate of unacceptable defects was of the order of 50% and large variations and inconsistencies between the results of various operators were found.

These results prompted to start a second phase of the NDT program with the aim to evaluate the factors which are responsible for the low reliability of manual ultrasonics.

This document deals with the recommendations for better reliability with respect to probes (transducers), flaw detectors, procedures, operators, etc.

IIW-V-972-91

Assessment of Nuclear Reactor fabrication-A Regulators View.

by Dr. R.D. Nicholson and Dr. B. Hemsworth

HM Nuclear Installations Inspectorate - merseyside

HM Nuclear Installations Inspectorate in carrying out its control and regulatory function, ensures that the highest practicable standards are used for the fabrication of new nuclear plants of the repair and replacement of components in existing plants.

In this document, various issues are discussed which must be considered during the design and fabrication of components to ensure the required high quality. These have been divided into three main areas, relating to materials, welding and inspection and indicate the range of assessments undertaken by Nuclear Installations Inspectorate.

V-953-91

Commission V working group - 2 Non-Destructive Testing of offshore welded construction - Annual Report 1990/91.

This document deals with activities of the working group-2 during 1990-91. The technical topics dealt with are ;

Reliability and comparative evaluation of surface techniques, offshore/underwater eddy current examination, fabrication versus in-service NDT. Underwater NDT personnel qualification schemes, automated and remotely operated NDT equipments for underwater use. etc.

The future work for 1991/92 by the group will consist of :

- Evaluate the necessity of and prepare for future revisions of DOC V-908-89 Information on practices for under-water Non-Destructive testing.
- Review special problem areas, new techniques and applications systematize information of general interest and if the informations are relevant, it shall be reported the guideline or recommendation proposal.

IIW-V-973-91

PISC III - A Status report

by S. Crutzen, P. Jehenson, R. Nichols, J. Stronsnider

The PISC Programme has the general objective of assessing procedures and techniques in use for the inspection of pressure components in particular the vessel and piping.

The programme is now on its third phase (PISC III). This document deals with the activities on the validation of the PISC II results (modification of the ASME Inspection Codes) on real structures

containing service defects and the extension of PISC methodology on most important structural Components made of different materials. The third phase insists on the capability demonstration with assemblies of real geometry containing realistic defects.

IIW-V-976-91

PISC II PARAMETRIC STUDIES Round Robin Test on the measurement of UT Instrument and Transducer Characteristics.

by E. E. Borloo

Within PISC II, a Round Robin Test (RRT) was performed by 9 teams on the measurement of certain characteristics of UT instruments and transducers. The participating teams were requested to apply the measurement procedure they normally follow when characterizing their equipment or when performing maintenance control.

The obtained results have shown a broad dispersion, the reasons for which are commented upon and important guidelines are given for organising the tests which involve codes, standards, clear definitions of terms and clear indications of the settings of all the equipment variables that can affect the results.

IIW-V-975-91

Parametric study on the Effect of UT Equipment Characteristics (EEC) on Detection, Location and Sizing.

by F. LAKESTANI, E. E. Borloo, F. Merli

Within II a parametric study was performed aiming to evaluate the effect of a rather large number of variable parameters of a UT testing system. Prob parameters, cable parameters and Instrument parameters have been considered individually and their effect on detection, location and sizing of defects is analyzed.

IIW-V-974-91

Work in to PISC program relevant to qualification and Performance Demonstration of NDE Techniques.

by R. Nichols, S. Crutzen, P. Jehenson, N. McDonald.

Performance demonstration for NDT has been an active topic for the past one decade. This often involves the training and qualification of personnel to achieve certification. From the PISC exercises it was suggested that in addition to the certification process, the techniques used should be proven techniques and appropriate test blocks (standards) should be available.

This document gives the conclusion that the NDT procedure has to be validated and tested for its performance and for the reliability of its applications on structures containing defects that, not necessarily being real ones, still do induce the real physical phenomena that the inspection techniques must be able to handle.

Mathematical models, involving a better understanding of the physical phenomena will also indicate which artificial defects could be used to replace natural ones for NDT techniques validation and inspection team training.