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FE048:

API 579-1/ASME FFS-1: *Fitness-for-Service (FFS) of Process Plant Equipment, Pressure Vessels, Piping and Storage Facilities*

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Training Description:

This programme will enable delegates to learn how to apply the rules of the international standard API 579/ASME FFS standard "Fitness-for-Service" in order to evaluate the integrity and quantify the remaining life of pressure vessels, storage tanks, piping systems. The presented methodology will also lead to a cost-effective run-repair-replace decision, and select the appropriate repair options.

Key highlights of this programme are:

- Identification of failure modes and material degradation mechanisms: stress corrosion, cracks, blisters, in the framework of API 579 /ASME FFS
- Methodology for quantitative evaluation of remaining life of the equipment based on its fitness for service
- Principles of integrity of equipment based on material properties of strength and toughness
- Application of fitness-for-service methodology for optimization of maintenance and repairs

The programme will provide practical knowledge and experience in evaluating the integrity and overall fitness for service of stationary equipment. It will provide a method of determining the remaining life of pressure vessels, storage tanks, piping systems and pipelines. The course will cover basic principles of application of API579 -ASME Code rules related to material properties that are important for consideration of stresses and fractures when making important decision about equipment regarding options: run or repair or replace.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Learn the latest techniques of assessing the fitness-for-service of pressure vessels, tanks and piping systems
- ✓ Acquire a methodology of quantitative evaluation of the remaining life of equipment
- ✓ Know making cost-effective run-repair-replace decisions based on the principles of API 579 / ASME "Fitness-for-Service"
- ✓ Be equipped with tools needed to assess defects in pressure vessels, storage tanks and piping
- ✓ Present and apply fundamental rules of ASME code related to structural integrity of equipment and their use to assess remaining life in service

Training Designed for:

This program is intended for Plant Engineers, Corrosion and Materials Engineers, Project Engineers, Reliability and Integrity Supervisors, Engineers related to safeguarding, Inspection Engineers for ressure equipment and piping systems, Maintenance and Operations Professionals and Supervisors.

Training Program:

DAY ONE:

- ❖ **PRE-TEST**
- ❖ **Introduction**
- ❖ **Foundations of Fitness-For-Service Assessment**
  - Overview of API & ASME codes and standards

- Overview of Mechanical Integrity of Pressure Vessels & Piping System
- Fitness For Service Concepts
- Structure and Contents of the FFS Standard
- Part 1: Introduction to FFS
- Part 2 – Fitness-For-Service Engineering Assessment Procedures

DAY TWO:

❖ Background of Stress Calculations for FSS Assessment

- Annex A – Thickness, MAWP & Stress Equations for a FFS Assessment
- Annex G – Damage Mechanisms, Deterioration and Failure Modes
- NDE (NDT) Techniques: PT, VT, MT, ET, UT, RT
- Part 3 – Assessment of Existing Equipment for Brittle Fracture
- Workshop: Example of Determination of thickness tmin

DAY THREE:

❖ Metal Loss, Corrosion, Pitting and Blisters

- Part 4 – Assessment of General Metal Loss: Corrosion Mechanisms
- Part 5 – Assessment of Local Metal Loss: Typical Mechanisms
- Workshop: Example of General Metal Loss Assessment
- Part 6 – Assessment of Pitting Corrosion
- Part 7 – Hydrogen Blisters, HIC & SOHIC
- Workshop: Example of Blister Assessment

DAY FOUR:

❖ Local Damage, Cracks, Creep

- Part 8 – Weld Misalignment & Shell Distortions
- Workshop: Example of Shell Distortion Assessment
- Part 9 – Assessment of Crack-Like Flaws
- Workshop: Example of Crack Assessment
- Part 10 – Assessment of Components Operating in the Creep Range

DAY FIVE:

❖ Fire and Mechanical Damage

- Part 11 – Assessment of Fire Damage
- Part 12 – Assessment of Dents, Gouges, and Dent-Gouge Combinations
- Part 13 – Assessment of Laminations
- Overview of Commercial Software

❖ Course Conclusion

❖ POST-ASSESSMENT and EVALUATION

Training Requirement:

"Hand's on practical sessions, equipment and software will be applied during the course if required and as per the client's request."

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:
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Training & Career Development Department