

## **API 579-1/ASME FFS-1 course content**

### **DAY ONE**

- 1 Overview and Opportunities for FFS documents**
- 2 Introduction to API 579-1/ASME FFS-1**
- 3 FFS Assessment Procedures**
  - 3.1 Applicability and limitations of the FFS assessment procedures**
  - 3.2 Data requirements**
  - 3.3 Acceptance Techniques and Acceptance criteria**
  - 3.4 Remaining life evaluation**
  - 3.5 Remediation**
  - 3.6 In-service monitoring**
  - 3.7 Documentation**
  - 3.8 Example problems**
- 4 Damage Mechanisms**
  - 4.1 Introduction**
  - 4.2 The need to identify damage mechanisms**
  - 4.3 Assessing potential damage mechanisms**
  - 4.4 Damage types**
  - 4.5 Sources of information on damage types**
  - 4.6 Inspection techniques for damage mechanics with focus on flaw characterization**

- 4.7 Introduction to API571**
- 4.8 Determining remaining life**
- 4.9 Determining mitigation strategies**
- 4.10 Determining monitoring strategies**

## **5 API 579 Appendices**

- 5.1 General**
- 5.2 Overview of Appendices**

## **6 Assessment of Equipment for Brittle fracture**

- 6.1 Applicability and limitations of the FFS assessment procedures**
- 6.2 Data requirements**
- 6.3 Acceptance Techniques and Acceptance criteria**
- 6.4 Remaining life evaluation**
- 6.5 Remediation**
- 6.6 In-service monitoring**
- 6.7 Documentation**
- 6.8 Example problems**

## **DAY TWO**

### **7 Assessment of General Metal Loss**

- 7.1 Applicability and limitations of the FFS assessment procedures**
- 7.2 Data requirements**
- 7.3 Acceptance Techniques and Acceptance criteria**
- 7.4 Remaining life evaluation**
- 7.5 Remediation**
- 7.6 In-service monitoring**
- 7.7 Documentation**
- 7.8 Example problems**

### **8 Assessment of Localised Metal Loss**

- 8.1 Applicability and limitations of the FFS assessment procedures**
- 8.2 Data requirements**
- 8.3 Acceptance Techniques and Acceptance criteria**
- 8.4 Remaining life evaluation**
- 8.5 Remediation**
- 8.6 In-service monitoring**
- 8.7 Documentation**
- 8.8 Example problems**

## **9 Assessment of Pitting Corrosion**

- 9.1 Applicability and limitations of the FFS assessment procedures**
- 9.2 Data requirements**
- 9.3 Acceptance Techniques and Acceptance criteria**
- 9.4 Remaining life evaluation**
- 9.5 Remediation**
- 9.6 In-service monitoring**
- 9.7 Documentation**
- 9.8 Example problems**

## **10 Assessment of HIC, SOHIC and Hydrogen Blister Damage**

- 10.1 Applicability and limitations of the FFS assessment procedures**
- 10.2 Data requirements**
- 10.3 Acceptance Techniques and Acceptance criteria**
- 10.4 Remaining life evaluation**
- 10.5 Remediation**
- 10.6 In-service monitoring**
- 10.7 Documentation**
- 10.8 Example problems**

## **11 Assessment of Weld Misalignment and Shell Distortions**

- 11.1 Applicability and limitations of the FFS assessment procedures**
- 11.2 Data requirements**
- 11.3 Acceptance Techniques and Acceptance criteria**
- 11.4 Remaining life evaluation**
- 11.5 Remediation**
- 11.6 In-service monitoring**
- 11.7 Documentation**
- 11.8 Example problems**

## **DAY THREE**

### **12 Assessment of Crack-Like Flaws**

- 12.1 Applicability and limitations of the FFS assessment procedures**
- 12.2 Data requirements**
- 12.3 Acceptance Techniques and Acceptance criteria**
- 12.4 Remaining life evaluation**
- 12.5 Remediation**
- 12.6 In-service monitoring**
- 12.7 Documentation**
- 12.8 Example problems**

### **13 Assessment of Creep Damage and Remaining Life**

- 13.1 Applicability and limitations of the FFS assessment procedures**
- 13.2 Data requirements**
- 13.3 Acceptance Techniques and Acceptance criteria**
- 13.4 Remaining life evaluation**
- 13.5 Remediation**
- 13.6 In-service monitoring**
- 13.7 Documentation**
- 13.8 Example problems**

### **14 Assessment of Fire Damage**

- 14.1 Applicability and limitations of the FFS assessment procedures**
- 14.2 Data requirements**

- 14.3 Acceptance Techniques and Acceptance criteria**
- 14.4 Remaining life evaluation**
- 14.5 Remediation**
- 14.6 In-service monitoring**
- 14.7 Documentation**
- 14.8 Example problems**

## **15 Assessment of Dents, Gouges and Dent-Gouge combinations**

- 15.1 Applicability and limitations of the FFS assessment procedures**
- 15.2 Data requirements**
- 15.3 Acceptance Techniques and Acceptance criteria**
- 15.4 Remaining life evaluation**
- 15.5 Remediation**
- 15.6 In-service monitoring**
- 15.7 Documentation**
- 15.8 Example problems**

## **16 Assessment of Laminations**

- 16.1 Applicability and limitations of the FFS assessment procedures**
- 16.2 Data requirements**
- 16.3 Acceptance Techniques and Acceptance criteria**
- 16.4 Remaining life evaluation**
- 16.5 Remediation**
- 16.6 In-service monitoring**
- 16.7 Documentation**

**16.8 Example problems**

**17 In-Service Margins/Validation**

**17.1 Design margins for new equipment**

**17.2 In-service margins for existing equipment**

**17.3 Validation**

**18 Overview of remaining life assessment, remediation, and methods to extend the life of damaged equipment.**



## **DAY FOUR**

### **19 Introduction to ASME PCC-2 standard (Scope, Organization, and Intent)**

- 19.1 Applicability and limitations of repair methods covered by ASME PCC-2**
- 19.2 Repair methods and techniques**
- 19.3 Welded Repairs**
- 19.4 Butt-Welded Insert Plates in Pressure Components**
- 19.5 Weld Overlay to Repair Internal Thinning**
- 19.6 Welded Leak Box Repair**
- 19.7 Full Encirclement Steel Reinforcing Sleeves for Piping**
- 19.8 Fillet Welded Patches**
- 19.9 Alternatives to Post weld Heat Treatment**
- 19.10 In-Service Welding Onto Carbon Steel Pressure Components or Pipelines, Weld Build-up, Weld Overlay, and Clad**
- 19.11 Restoration, Mechanical Repairs (Non-welding repairs)**
- 19.12 Mechanical Clamp Repair, Inspection and Repair of Shell and Tube Heat Exchangers, Mechanical repairs, with sealant.**
- 19.13 Non-metallic Composite Repair Systems**
- 19.14 Examination and Testing, Pressure and Tightness Testing of Piping and equipment,**
- 19.15 Non-destructive Examination in Lieu of Pressure Testing for Repairs and alterations**
- 19.16 Documentation and Records of repairs**
- 19.17 Real-world examples and case studies**