

Task Group 7 – FFS & RBI

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EPERC TG7 Chairman

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Minutes of the 2nd TG7 web-meeting

Thursday March 3rd, 2022 - 14:00 – 17:00 (Paris Time)

1 Chairman Welcome of Participants

PARTICIPANT	E-mail address	Member	Country	Present
Andrea Tonti	a.tonti@inail.it	YES	Italy	YES
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Pai Gopalkrishna	gopalkrishna.ipr@gmail.com	NO	India	NO

2 Chairman General EPERC TG7 Introduction

2.1 Remarks on previous meeting

- No Urgent remarks
- Send an email (with EPERC in the Title) if you have a particular remark

2.2 Remember EPERC Strategic Plan

- Comparison of International Codes & Standards
- Identification of Gaps & Needs with Code Organization and Industry
- Developments of R&D programs associated to dedicated Road Map developed by topics at the TG level
- Development of Recommended Practices with all the rules/data validation
- Performance of Benchmarks on practical cases
- Code Case Proposal

- Knowledge transfer through: Regular Thematic Technical Seminars, International Conference, Training courses, Master Classes, Summer School, Reports and Documentation
- Communication and Registration to different EPERC Activities through:

www.eperc-aisbl.eu

2.3 Overview of the EPERC TG7 Road Map

- WP1 : International Codes comparison
- WP2 : Major Degradation Mechanism
- WP3 : Complementary FFS Research Program
- WP4 : Local Approach of Rupture
- WP5 : Complementary RBI Research Program
- WP6 : Benchmarks
- WP7 : Final Recommended Practices
- WP8 : Synthesis and Code Cases Proposals
- WP9 : Knowledge Transfer

3 Selected Topics for this 2nd meeting

3.1 International Codes comparison on FFS

3.1.1 FFS: ASME BPVC Sect XI, ASME BPVC Section XI Appendices and Code Cases, RSEM/RCC-MRx, R5-R6, BS 7910, FITNET, API-ASME FFS, VERLIFE, JSME, KEPIC...

Focus 1st on Cracks:

- K definition and handbooks
- Fatigue crack growth rules
- Fatigue crack growth material properties

3.2 1st Preliminary Recommended Practices Report

3.2.1 FFS: for K and Fatigue crack analyses

Each topic the Report will consider:

- Definition and Scope
- Existing Analysis methods and criteria
- Other particular approaches and criteria
- Associated Material Properties needed
- Methods and Material data validations: theoretical, experimental, standards...

3.2.2 For K and Fatigue Crack Analysis

- K, J handbook
- Fatigue crack growth: $da/dN = \Delta K_{eff}$
 - o plastic zone K correction
 - o mode I, II, III combination
 - o R ratio correction, negative R ratio, crack closure
 - o mode I, II, III combination
 - o transient combination
 - o ΔK or ΔJ – primary/secondary stresses
 - o K_{max} limitation
 - o da / dN curves
 - o threshold
 - o environmental effects, including hydrogen
- Specific cases
 - o Welds: homogenous and dissimilar
 - o Residual Stresses

4 General Discussion and remarks

4.1 Hydrogen Technology

- Need of general introduction on Hydrogen Technology
- Metallic – Non Metallic materials
- Typical operating conditions (up to 700 bar)
- Major topics to analyze

4.2 Other topics discussed

- API 579-ASME FFS
- CETIM –CTM Maintenance Code
- **How to catch last Code Editions?**
- CO₂ environment: define the technology concerned and operating conditions; the degradation modes are different than hydrogen...
- ASME BPVC.X:2021 - ASME Boiler and Pressure Vessel Code - Section X: Fiber-Reinforced Plastic Pressure Vessels
- Aluminium pressure equipment: define more precisely the needs

5 TG7 Tasks before next meeting

5.1 General overview of FFS

- **Author:** Claude FAIDY
- **Reviewers:** all TG7 members
- **Planning:** draft report for March 21

5.2 International Code comparison

- **Author:** Claude FAIDY
- **Contributor** for "French CMT Maintenance Code": A. Chaudouet
- **Reviewers:** all TG7 members
- **Planning:** draft report for next TG7 meeting

5.3 Hydrogen Technology and Consequences: short overview

- **Author:** Jader FURTADO
- **Reviewers:** all TG7 members
- **Planning:** draft report for next TG7 meeting

5.4 General Literature review

- List of Key References **from each participant** to be sent to TG7 Chairman: Claude Faidy
- **Planning:** first status at the next meeting

6 Conclusions

- Interesting meeting for a **very large scope** of technical topics...
 - Any participant can send an email to the TG4 Chairman (with EPERC in the Title), in order to ask a question, propose remarks or suggestions, present a practical case to the TG4 Chairman and to registered EPERC members
- NEXT TG7 meeting:** preliminary date to be confirmed:

April 18, 2022 – TEAMS Meeting
