



International Probabilistic Fracture Mechanics Benchmark for Piping Applications

xLPR User Group Meeting

August 18, 2021



PROBABILISTIC FRACTURE MECHANICS CODE



NEA

NUCLEAR ENERGY AGENCY

Organizing Committee

Committee on the Safety of Nuclear Installations,
Working Group on Integrity and Ageing of
Components and Structures



PROBABILISTIC FRACTURE MECHANICS CODE

PARTICIPATING ORGANIZATIONS

SNC Lavalin (Candu Energy Inc)*

JAEA (Japan Atomic Energy Agency)

U.S. NRC (United States Nuclear Regulatory Commission)*

LEI (Lithuanian Energy Institute)

CRIEPI (Central Research Institute of Electric Power Industry)

MPA (Materialprüfungsanstalt) University of Stuttgart

EMC² (Engineering Mechanics Corporation of Columbus)

NRG (Nuclear Research and Consultancy Group)

SIA (Structural Integrity Associates)

KINS (Korea Institute of Nuclear Safety)

VTT (VTT Technical Research Centre of Finland)

KIWA (Kiwa Inspecta Technology AB)

PSI (Paul Scherrer Institut)

GRS (Gesellschaft für Anlagen- und Reaktorsicherheit)

IPP-Centre

15

* Co-leads



OBJECTIVES

1. Understand differences in probabilistic fracture mechanics (PFM) software design
2. Understand effectiveness of nondestructive examination in reducing failure probabilities
3. Understand effectiveness of leak detection in reducing failure probabilities
4. Reconcile deterministic and probabilistic leak-before-break approaches





PROJECT PLAN



Questionnaire on PFM code design



Deterministic benchmark problems



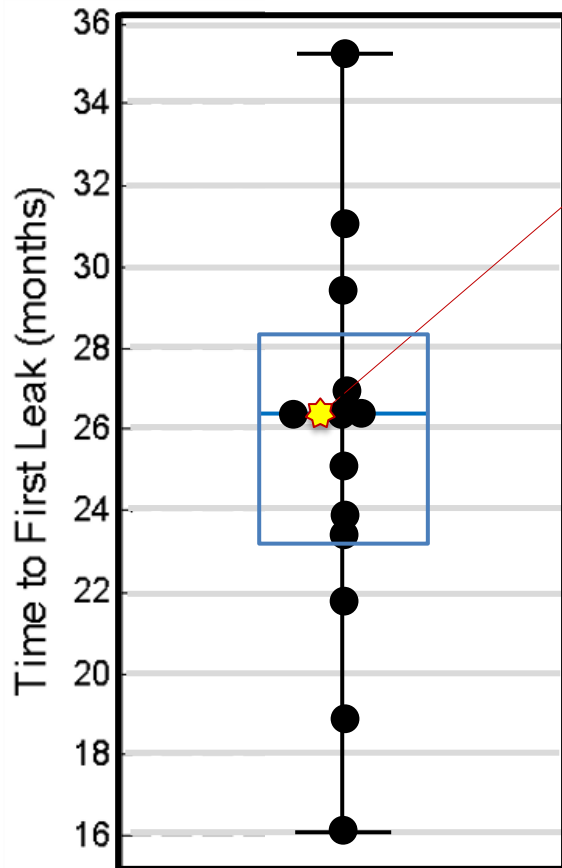
Probabilistic benchmark problems



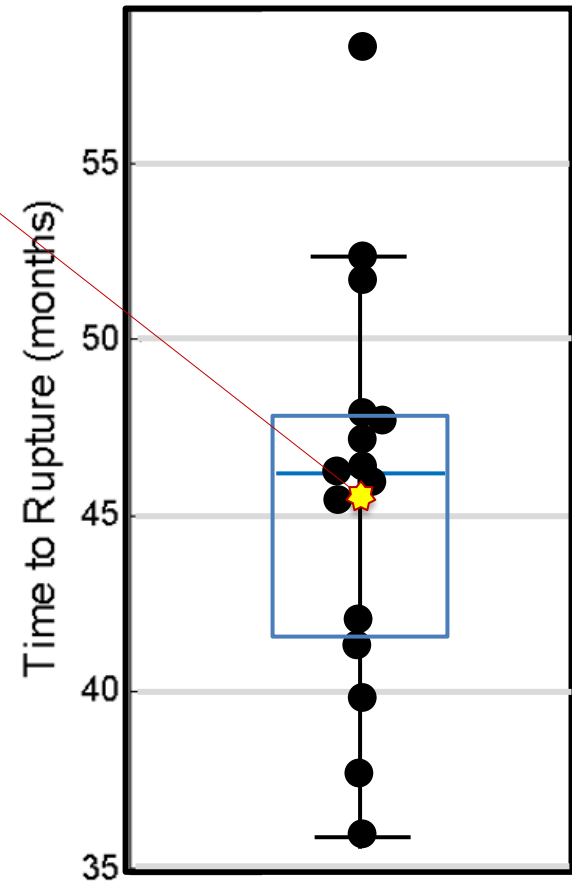
Final report and analysis



PRELIMINARY RESULTS DETERMINISTIC PROBLEM 1

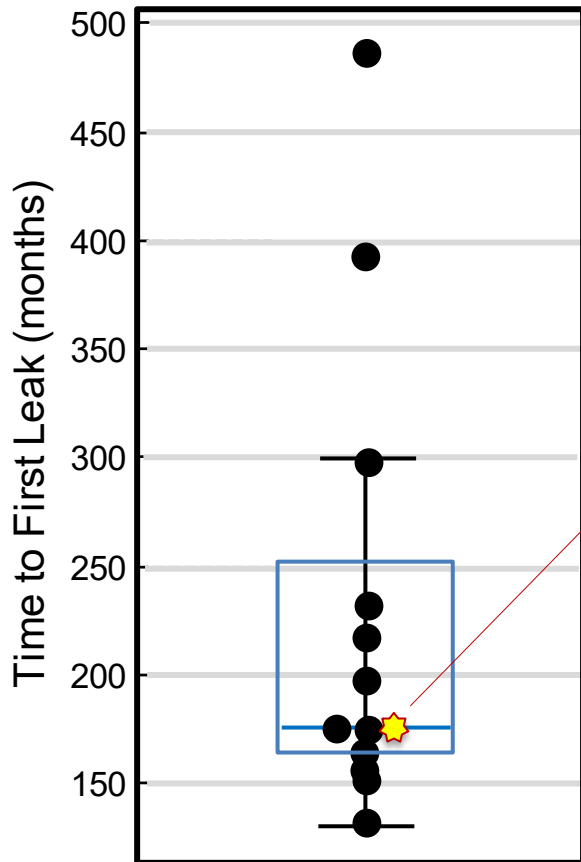


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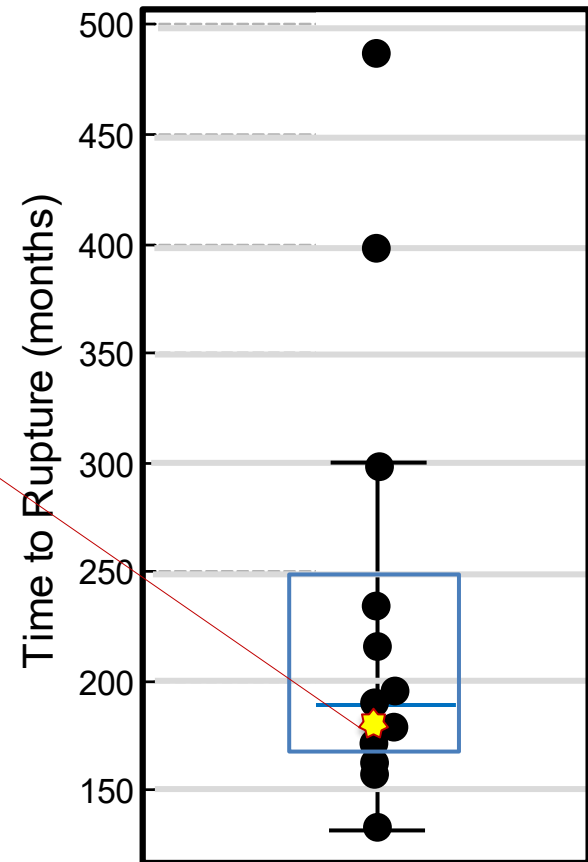




PRELIMINARY RESULTS DETERMINISTIC PROBLEM 2



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LOOKING FORWARD

Much More to Come!
