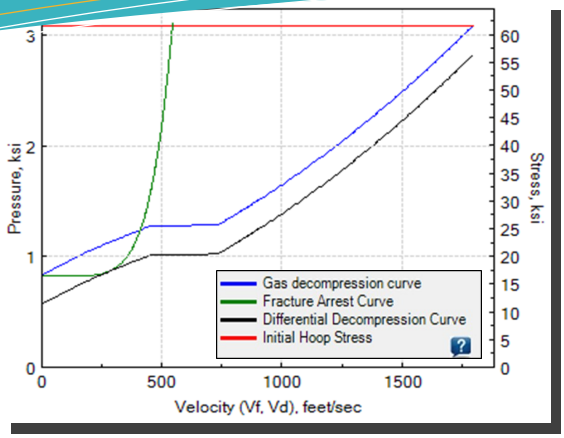
Emc²PDFA

The prediction of unstable axial ductile fracture behavior in high energy pipelines



Emc²PDFA allows the user to predict unstable axial ductile fracture behavior in high energy pipelines to:

- Ensure adequate toughness for crack arrest in the pipe body, or
- Calculate the unstable crack speed for crack arrestor design analysis*, or
- Compare experimental results to predictions for arrest or crack propagation speeds.

Please email **Emc2PDFA@emc-sq.com** for further information or purchase requests.

Predicting unstable axial ductile fracture behavior

Emc²PDFA (***P***ipe ***D***uctile ***F***racture ***A***nalyses) has been completely updated from its predecessor versions and its 2012 visual studio version is compatible with Windows 7 operating systems. Emc²PDFA has self-contained help and technical basis support features that are fully referenced in the Help section. Some unique features of Emc²PDFA include:

- The iteration scheme for the GASDECOM equation-of-state has been further updated to provide smoother decompressed pressure versus wave velocity curves.
- The default number of pressure incremental steps is 200, with a user limit of up to 1,000. This is based on sensitivity studies conducted at Emc².
- User can input decompression curves from any other equation-of-state program if desired.
- For underwater pipeline applications, the differential pressure is calculated based on water depth (fresh or sea water), and applied to the decompression curve. Results have been validated from expansion tube tests in pressurized water environments.
- The soil backfill uses either the original BTC coefficient, or an updated version from a PRCI/DOT project that accounts for the different soil types (cohesive versus non-cohesive soils, i.e., clay versus sand) and backfill depths**.
- The water backfill coefficient has been validated with various underwater pipe burst tests.
- User can switch back and forth from US customary to SI units .
- User can use Charpy energy or DWTT energy for fracture toughness.
  - ◊ Charpy energy with original BTC equation, Leis, or Wilkowski modification; as well as statistical modifications for pipe grade for each Charpy approach.
  - ◊ Charpy energy modification for fabrication effects on new linepipe steels included with guidance, i.e., in some new steels even traditional grades like X65 require correction factors on the Charpy energy.
  - ◊ DWTT energy can be from either the pressed-notch DWTT or static-precracked/brittle weld DWTT specimens that eliminate the initiation energy in the PN-DWTT.

    Note: DWTT energy is independent of grade or fabrication effects, and can be used for rising-shelf steels exhibiting separations on the fracture surface.
- Input can be saved and modified easily for multiple sensitivity studies.
- Output is shown in tabular form and graphically, but can also be saved for importing into Excel files.

LICENSING

Each copy of Emc²PDFA is provided as a single seat, perpetual license. Emc²PDFA operates best under Windows 7 platforms. A security dongle is included with each package for license control.

SUPPORT

Included with the Emc²PDFA software package is up to 8 hours of Emc² technical support which can be used for either IT or analysis questions.

COST & SUPPORT

Number of copies	Price for each copy	Total consultation time for IT or technical questions during 1st two years
First copy	US$5,000	8 hours
Second copy	US$4,000	4 additional hours (12 total hours)
3-5 copies	US$3,500 (3rd to 5th copy)	Total of 12 hours
6-10 copies	US$3,000 (6th to 10th copy)	Total of 18 hours
Above 10 copies	US$2,500 (10th plus copies)	Total of 18 hours

* *G. M. Wilkowski, et al., "How to Optimize the Design of Mechanical Crack Arrestors," IPC2006-10357, 2006 International Pipeline Conference.*
** *https://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=127&btn=Modern+Search*

Engineering Mechanics Corporation of Columbus
3518 Riverside Drive-Suite 202
Columbus, OH 43221
Phone (614) 459-3200
Fax (614) 459-6800
web-page: www.emc-sq.com