

Flaws (such as cracks and other forms of welding defects) can arise during the manufacture and use of metallic components. An Engineering Critical Assessment (ECA) is a fitness-for-service procedure that uses fracture mechanics principles to determine the flaw tolerance of safety critical components. ECA is therefore often used to supplement the simple workmanship-based flaw acceptance criteria stated in construction codes.

British Standard BS 7910 "Guide to methods for assessing the acceptability of flaws in metallic structures" is an ECA procedure developed and published in the UK but used worldwide. Even a straightforward analysis to the BS 7910 standard typically requires the use of multiple parametric equations, and there is often a need to carry out complex iterative calculations. Specialist software is invaluable in performing, reporting, editing and archiving such calculations and it is for these situations that the CrackWISE® software was developed.

TWI has developed structural integrity software since the early 1990s when the DOS-based program CrackWISE® was first released. Since then, the software has been redesigned and re-released on several occasions, reflecting changes in both the underlying procedure and the software/hardware platforms available to engineers at the time.

A new version of BS 7910 was published in December, 2019. The revisions regarding fracture and fatigue procedures in BS 7910:2019 have prompted the development of a new version of CrackWISE®, Version 6 (CW6), replacing earlier versions of the software.



What is new in CrackWISE® 6?

The existing key features includes

- Wide range of structural and flaw geometries
- Fracture assessment
- Fatigue crack growth assessment
- Combined fracture and fatigue assessment
- Annex T toolkit giving guidance on NDT capability

Reflecting the new version of BS 7910

- Inclusion of a pdf of BS 7910:2019
- Compatibility between the interface and the BS 7910:2019 document (eg the clause numbers that come up in the 'case setup' screen will reflect those in the new procedure),
- Implementation of revised solutions, where appropriate (eg there is a revised solution for axial surface-breaking flaws in pipelines under pressure, and some minor changes to other solutions).

- Primary/secondary stress interaction calculation defaults to V rather than ,
- Annex K PSFs remain, but as legacy variables for backward compatibility (generic PSFs for fracture have been removed from the 2019 revision),

Improved functionality

- Batch runner which allows multiple fracture/fatigue cases to run simultaneously
- Maximum Likelihood toolkit (Annex L)
- Constraint toolkit (Annex N)

Future features (will be released after the main software)

- Strain-based assessment (Annex V)

Key benefits of CrackWISE® 6

- Automates the widely-accepted flaw assessment procedure, BS 7910
- Fully compatible with the fracture and fatigue clauses of BS 7910: 2019. An analysis carried out using CW6 is therefore compatible with the document and traceable to the relevant clauses
- Based on over 20 years of experience in software development and ECA consultancy
- Extensively validated software, developed under the TickIT scheme
- Latest advances in fracture assessment techniques incorporated
- Current edition of BS 7910 in pdf included
- User-friendly interface, intuitive to both existing and new CrackWISE® users
- Software and technical support available

Industrial applications

- Worldwide, throughout the oil, gas and petrochemical industries, the power sector (nuclear, fossil and renewable), the construction industry and the transport sector
- For a wide range of structures including pipelines, pressure vessels, piping, tanks, buildings, bridges, ships, road transport and aircraft
- Throughout the life cycle, including design, in-service assessment, life extension and failure investigation.

Training

- Practical application of BS 7910 procedures for the assessment of flaws in structures: this is a four day course intended for structural, civil, design, maintenance, welding and inspection engineers and those responsible for optimising asset performance or risk management, and includes use of CrackWISE® software
- CrackWISE® Training Workshop – one day training workshop intended for engineering staff involved in fitness-for-service assessment.

Free demonstration software

Free demonstration software is available for download from:

<https://www.twisoftware.com/software/integrity-management-software/crackwise/>

Contact us at: crackwise@twi.co.uk



VERSION 6

CRACKWISE

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