Wilde

ReliaSoft®

FRACAS: From Data Collection to Problem Solving

Testing, data collecting and data analysis are probably the three major daily tasks for most reliability engineers. How to utilize the modern database and Internet technology to manage the testing, data collecting and problem solving process across multiple departments is a challenging issue that many organisations are facing. XFRACAS, a web-based FRACAS tool from ReliaSoft, provides an organisation-wide platform that connects all the reliability-related management and analysis activities together.

What is FRACAS?

FRACAS stands for Failure Reporting, Analysis and Corrective Action System. The FRACAS process originated from the defence and aerospace industries in the 1970s. It was an essential element in the early and sustained achievement of the reliability and maintainability potential inherent in military systems, equipment and associated software.

Since the late 1970s and through the 1980s, major players in defence, aerospace, automotive and telecommunications worldwide invested millions of dollars to develop and support in-house FRACAS-related software using spreadsheets and databases. In 1985, the MIL-STD-2155 standard was created to standardise the scope, definition and implementation of the FRACAS process.

What can FRACAS do?

The FRACAS method is used in many applications, such as safety/risk reduction systems, process control systems and incident reporting systems. It provides a disciplined and aggressive closed-loop process for solving issues at the design, development, production and deployment stages. The fundamental tasks include:

- Recording and capturing information about failures and problems.
- Identifying, selecting and prioritising failures and problems.
- Identifying, implementing and verifying corrective actions to prevent recurrence of failures.
- Providing information from failure analysis and corrective actions in order to support reliability data analysis.
- Providing report summaries of incidents counts, and providing data used for reliability and quality metrics.

As an example, the following screenshots show portions of the failure/incident reporting page from ReliaSoft's XFRACAS software tool.

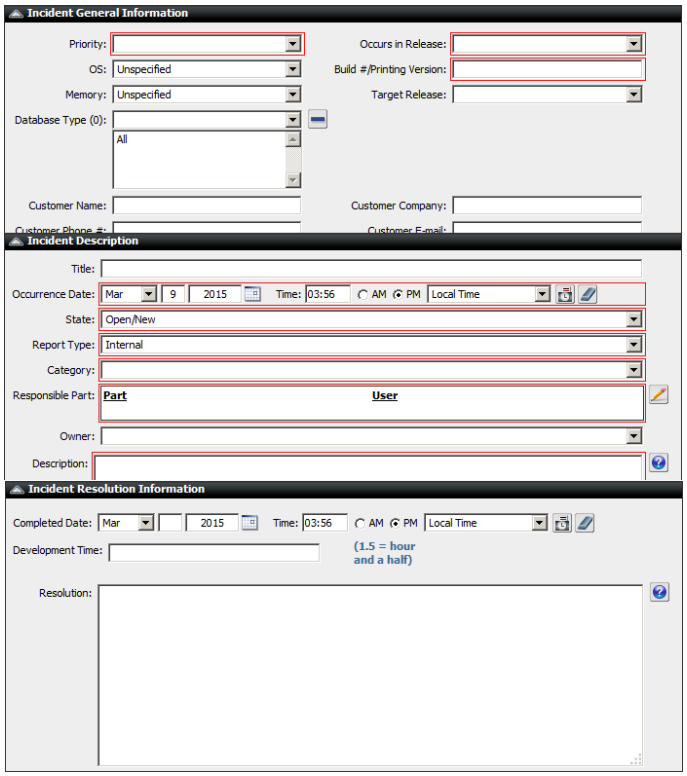

Fig. 1: Screenshots from XFRACAS (Courtesy: ReliaSoft)

This web-based interface is highly configurable. Organisations can add, remove and define fields based on their own needs.

Business Benefits

The FRACAS method promotes the reliability of a product or process by establishing a formal workflow followed by the entire organisation. It gives the following benefits:

- Provides engineering data for corrective actions and preventive actions.
- Identifies developing patterns of deficiencies.
- Provides failure data for reliability analysis.
- Helps avoid recurrence of failures in future designs.
- Provides a centralised location for lessons learned, helping to reduce time and effort for resolving both individual incidents as well as problems.
- It is essential for Quality/ISO certifications and audits.

The FRACAS method also promotes reliability improvement throughout the life cycle of a product. It can be used and applied during:

- Initial product design/redesign to identify and eliminate known issues.
- In-house development testing to improve the product, process or service.
- Field testing.
- Production and operations to increase efficiencies.
- Capital equipment installation, reducing costs and time.
- Product support in the field (end-user/customer).

The FRACAS system is no longer limited to simple failure reporting, analysis and correction, because it can be integrated with formal problem resolution methods such as the "8 Disciplines" (8D) approach (Fig. 2). XFRACAS can also be configured to capture the details of failure analysis investigations. This gives a complete record of an organisation's response to a particular failure. ReliaSoft's Weibull++ and RGA and Xfmea software applications are integrated into XFRACAS, facilitating use of failure data to perform reliability analysis. XFRACAS also provides database features such as querying, tracking and reporting. Users can easily track the progress of projects and uncover bottleneck problems, as well as track the status of each team member's current tasks. In addition to the system's powerful closed-loop action management capabilities (automated e-mail notifications, easily generated status reports, etc.), XFRACAS allows users to create checklists, link or attach related documents, query the "knowledge base" of past issues/solutions and identify stages (gates) that require formal review/approval.

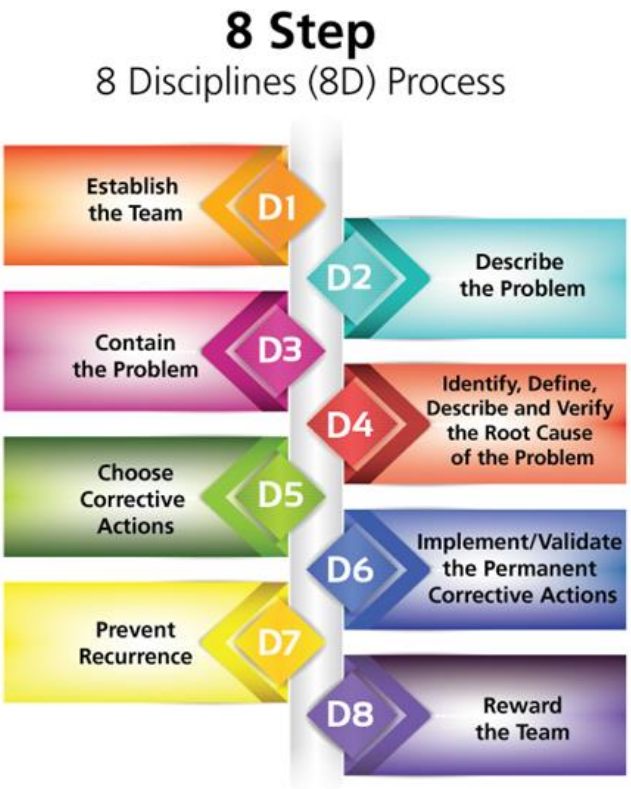

Fig. 2: "8 Disciplines (8D) approach (Courtesy: ReliaSoft)

Implementing FRACAS

FRACAS can be applied in different ways. Best practices for implementing FRACAS include:

- Tailor FRACAS to meet specific needs.
- Define and develop the FRACAS process and educate all teams involved.
- Ensure there is a clear distinction between incidents and problems.
- At a minimum, provide support for incident reporting and resolution, failure analysis and problem resolution.
- Strive to create a data repository of lessons learned and reliability data to support further analyses.

Adapted with permission from 'Reliability Hotwire', issue 169, ReliaSoft. For further information please visit http://www.reliasoft.com/ and http://wildeanalysis.co.uk/reliability/software.