T-OCA Development History

- 1988 - Petrochemicals Plant
- 1989 - Oil Refinery
- 1989 - Oil Production
- 1989 - Gas Production
- 1992 - Storage Tanks
- 1994 - FPSO
- 1997 - Pipeline Network
- 1998 - LNG Plant
- 2001 - Thermal Power Plant
T-OCA Users by Industry

- Refineries
- Chemicals
- Oil & Gas Production
- Pipelines
- LNG
T-OCA Principles

- T-OCA provides semi-quantitative, rule based probability and consequences of failure analysis.
- It includes qualitative and quantitative assessments.
- It uses a 3x3 or a 5x5 Risk Matrix.
- In the latest version, users can choose between Classic T-OCA risk assessment or API 581 risk assessment.
- It is API RP 584, *Integrity Operating Windows* compliant
- It includes TaskMaster module for inspection plan development.
The T-OCA home Screen includes an Asset Tree View.
The Asset Tree can be expanded to component level.
The Asset Tree includes a traffic light system.
Right click on an asset to Change, Delete, View, Copy or Rename an asset. Also go to TaskMaster for inspection planning.
T-OCA can import from or export to Excel spreadsheets.
Software Configuration

- T-OCA can be configured to user requirements
Software Security

- T-OCA administrator can define user levels and user rights
RBI Implementation with T-OCA

- T-OCA implementation follows a simple step by step process to complete the RBI analysis.
- T-OCA contains both probability of failure models and consequences of failure models that automatically calculate probability of failure and consequences of failure based on process stream composition, system operating conditions and materials of construction.
The initial assessment is calculated by:

1. Define process streams
2. Define process systems (corrosion loops)
3. Qualitative assessment on a circuit basis
4. Assign piping and equipment to circuits
5. Enter or import piping and equipment data
6. Calculate Damage Mechanisms, Probabilities, Consequences and Risk
Production Units

- T-OCA organizes data and work on a Production Unit Basis.
The RBI assessment begins with the defining of the process streams.
After process streams, process systems (corrosion loops) are defined and piping and equipment are assigned to the system.
Process systems (corrosion loops) carry a number of properties that are inherited by equipment belonging to the system.
Risk Models (1)

- Classic T-OCA has used a 3x3 risk matrix for over 20 years.
T-OCA Classic Model

- T-OCA Classic Risk Model uses 8 Consequences Factors and 12 Failure Mode Categories.
T-OCA now has the API 581 option with the 5x5 risk matrix.
The API 581 Risk Model uses 4 Consequences Categories and 4 Failure Mode Categories.
Additional files may be attached to equipment records and opened within T-OCA.
Additional Files

- Additional files may be attached to equipment records and opened within T-OCA.
After completing process streams, process systems, data entry/import and qualitative assessment, T-OCA automatically calculates the initial assessment.
Following the initial risk assessment, the PIR is used to input inspection results and make changes to the calculated values.

PIR is used to store the current assessment in an archive so that changes may be tracked over time.

For a newly built plant, PIR may not be necessary and the inspection planning can be based on the initial assessment.

For any other plant, the PIR process allows inspection data and other knowledge to modify the assessment.
The materials tab is used to change or validate materials data.
PIR Process

- The process tab is used to change or validate system and process data.
The inspection tab is used to include measured corrosion rates and inspection dates.
The consequences tab is used to change the calculated consequences.
The consequences tab is used to change the calculated consequences.
The probability tab is used to change the calculated probability of failure.
The probability tab is used to change the calculated probability of failure.
Reports, photographs, drawings and spreadsheets may be attached to the database before the PIR is completed.
TaskMaster is used to complete the inspection planning once the assessment is complete.

TaskMaster is based on building a list of standard tasks with associated intervals and then building a set of rules based on risk that are used to attach tasks and intervals to the equipment and piping.

TaskMaster can calculate the inspection schedule if the inspection completion dates are included.
TaskMaster Tasks

- Tasks are standard activities with associated methods and intervals.
TaskMaster Rules

- TaskMaster rules associate tasks and intervals with equipment. Rules can be built individually or by the use of a matrix.
TaskMaster Results

- TaskMaster analytical tools can show the distribution of intervals for any Task.
TaskMaster Results

- TaskMaster analytical tools can show the distribution of due dates for any Task.
From the TaskMaster review form, the work can be scheduled and methods assigned.