

Risk Based Management

ASME Seminar

By

Chow Ngai Mun

**M.Sc., Ceng, FIMMM, AWS CWI, ASNT/ACCP/EN 473 Level III (UT, RT, MT, PT),
PCN Level II TOFD, API 653, 510, 570, 580 and 571**

Singapore Welding Society (1st Vice President)

Engineering Manager (Shell Chemicals Seraya Pte Ltd)

What is Risk Based Management ?

Benefit of RBM

- An overall reduction in risk for the facilities and equipment assessed;
- An acceptance/understanding of the current risk;
- Inspection and maintenance activities can be focused and more cost effective.

Where you use RBM?

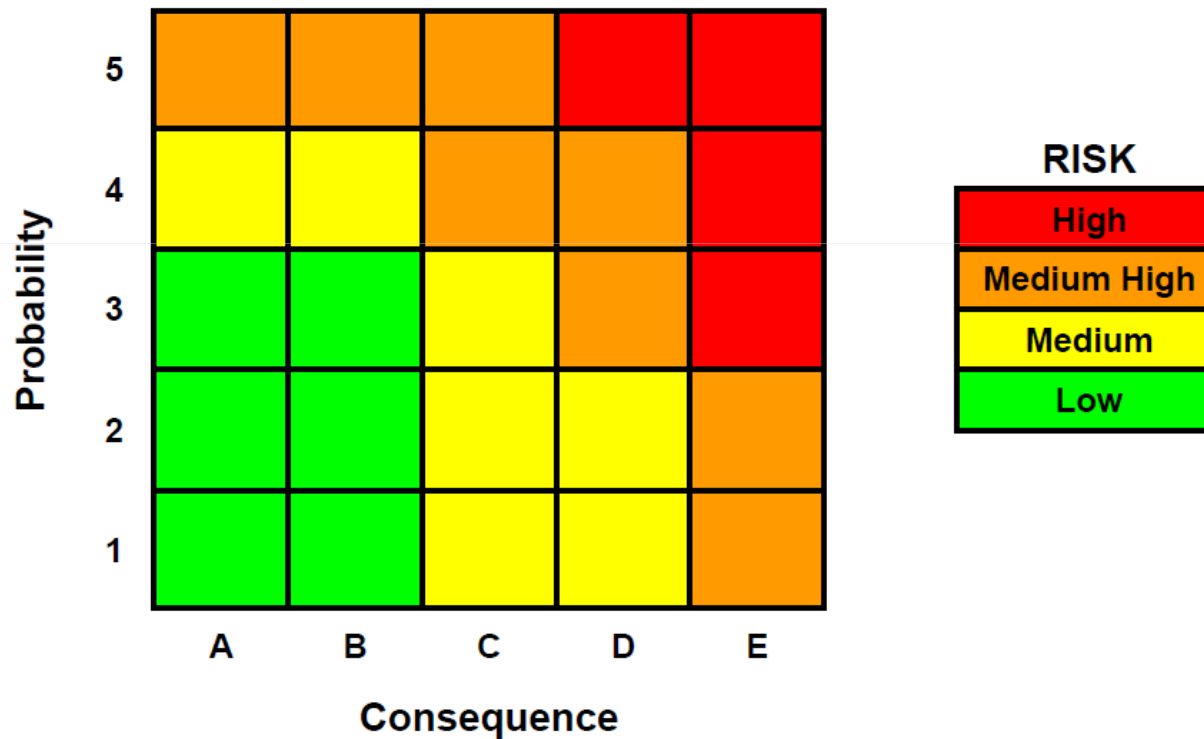
- Ensure Safe Production
- Process safety: JHA (job hazard analysis); QRA (quantitative risk assessment)
- RBI
- IPF (Instrumented Protected System)
- RCM
- ME

Example: RBI

Risk is the combination of the probability of some event occurring during a time period of interest and the consequences, (generally negative) associated with the event. In mathematical terms, risk can be calculated by the equation:

$$***Risk = Probability \times Consequence***$$

Risk assessment matrix (RAM)



- Inspection frequency / Inspection effectiveness / NDT method will affect the probability of failure
- Determine the consequence of failure by introducing corrosion loop/circuit

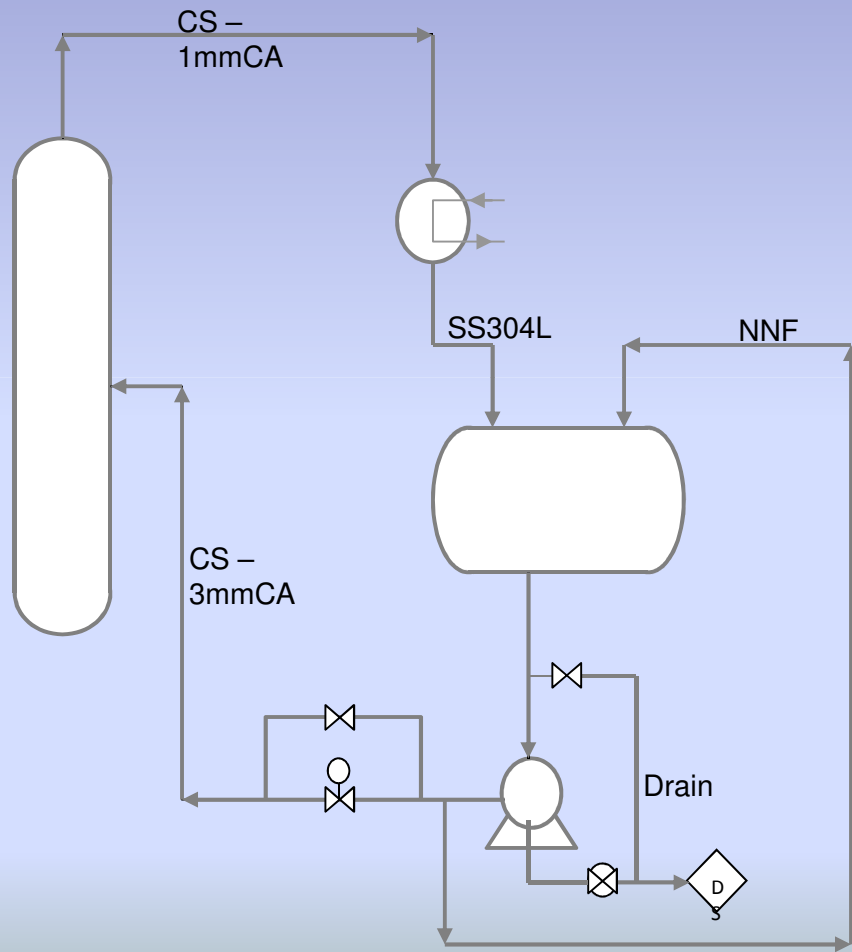
- **Corrosion Loop**

Grouping of equipments and piping based on the same process condition (service medium, operating condition) and material selection criteria resulting in the same degradation mechanism

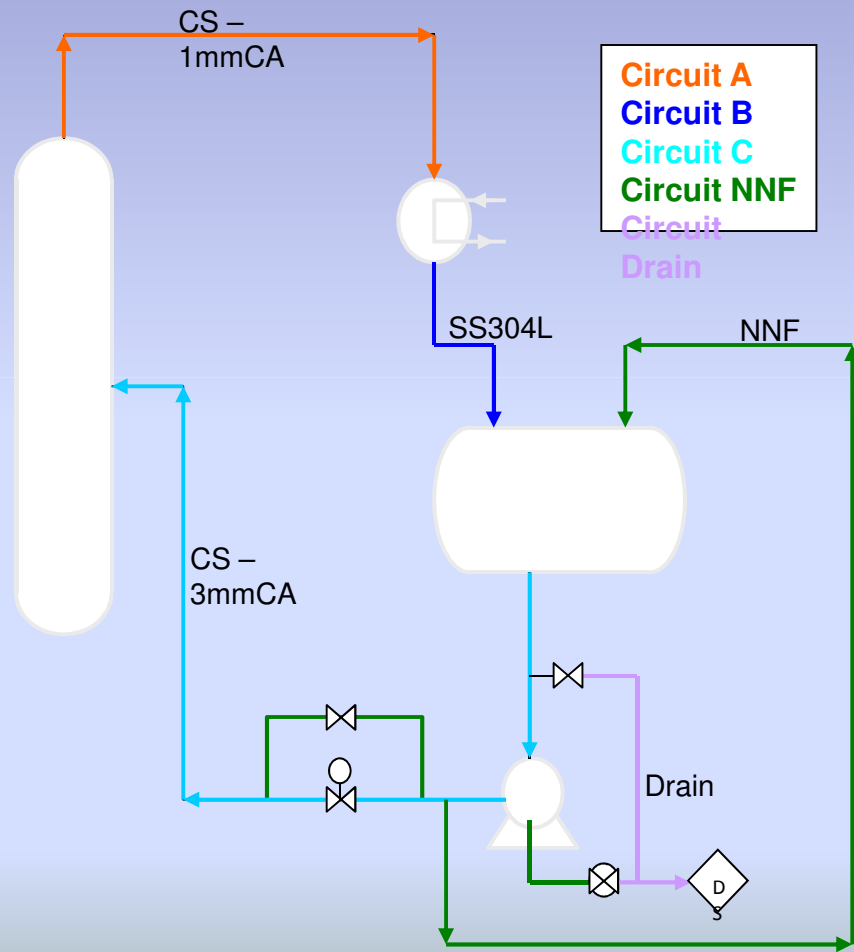
- **Circuit**

Subsection(s) of a part of equipment or piping system where the metallurgy is the same and the corrosion rate is expected to be the same (e.g., shell, channel, running line, dead-legs, drain system, injection/mixing point)

Corrosion Loop



Circuit



Data Management System

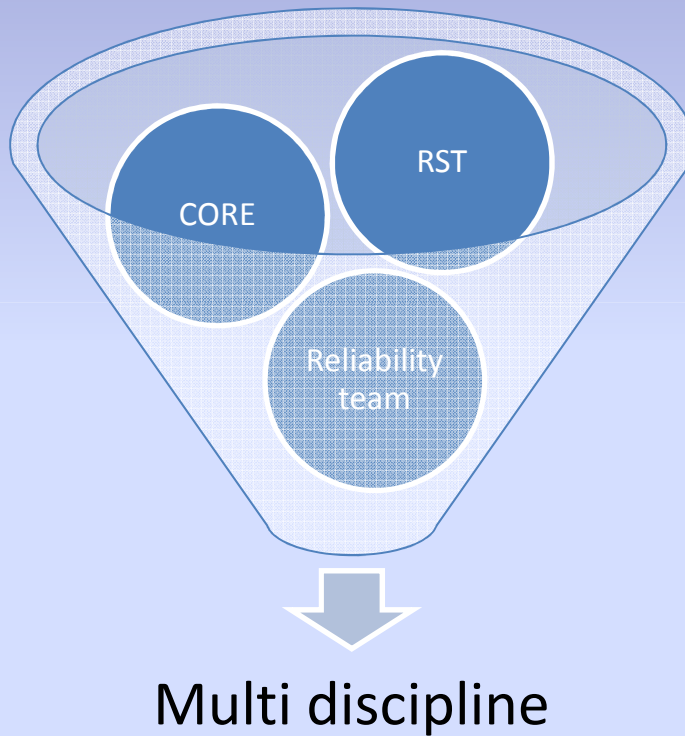
To record:

- Equipment data, including specifications, history, and related documents and drawings
- Human resources data, including employee information

With data management system and inspection, you can:

- Reduce equipment failures and downtime
- Effectively track equipment history and spot trends
- Maintain easy access to equipment and location information but still have the proper security and control over that information
- Effectively schedule and track inspections, enter and maintain inspection results, and calculate corrosion rates and renewal dates

Implementation

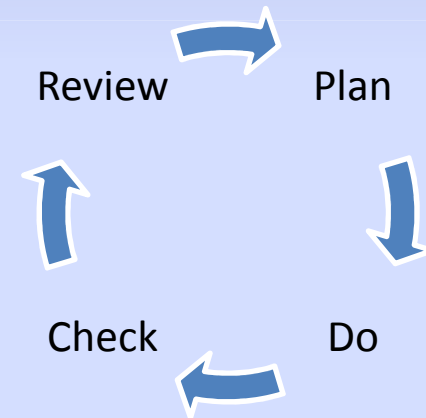


To Fulfill:

Statutory requirement

Industrial standard

Company standard



How RBI work/integrate with others

- Risk based management
- SIL
- RCM
- Maintenance Excellence
- Ensure safety procedures

When to apply RBM

- Model set up
- Pilot study
- Implementation
- Continuously study

Reference
API 580, 581

Q & A