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**Asset Management** 



# RELIABILITY, AVAILABILITY & MAINTAINABILITY RAM

## RBITAL

## AL Operational Excellence

HSEQ Consultants

Reliability

**Availability** 

Maintainability

**Safety Case** 

**PED** 

MD

**ATEX** 



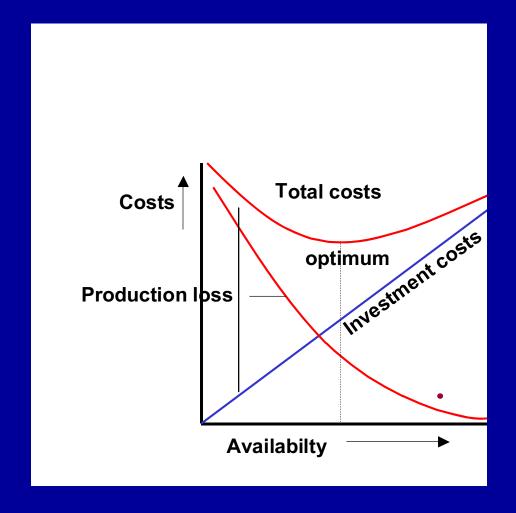
**RCM** 

PSI

**IPF** 



## **Production Optimization**





## RISK BASED INSPECTION RBI

## RBITAL RBI Definition

HSEQ

activities.

ConRiskt Based Inspection is an optimisation process of the risks covered by inspection

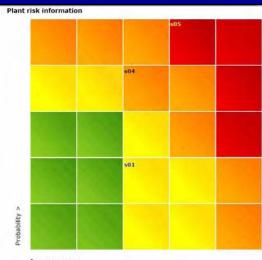
- RBI is a general method that can be applied to any installation and structure.
- Risk is classically defined by its probability of occurrence and by the consequences of its effects.
- Within RBI approach, the interest relies on the assessment of the inspection effort in reducing/maintaining the risk level.



## RBI Output

**HSEQ** 

### Consultrisk Matrix on Plant Level Risk Matrix on System Level



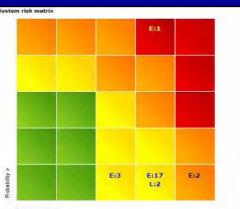
Consequences >

### Plant risk categories:

s05 (BDF system (complete))

s04 (Recievers Bergen & Bergermeer)

NS1 s01 (Reciever Groet)



### System risk information

Description / From line - T	o line
Regeneration cooler	
regeneration heater	
4	
Regeneration cooler	
Dust filter 4	
Regenration seperator	
Regeneration seperator	
Regeneration seperator	
water/condensate seperat	10
0.00	
D*9	



## RELIABILITY CENTERED MAINTAINCE RCM

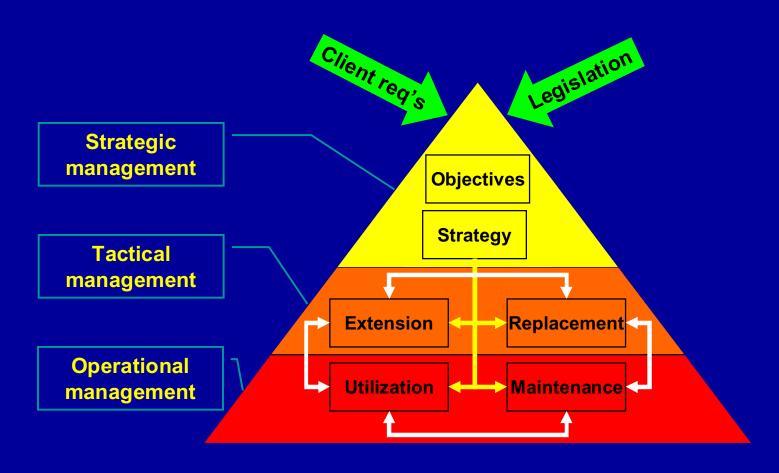


## Traditional Approach





## RCM Management





## RCM TACKLES THE UNDERLYING MAJOR LIFECYCLE COST ITEMS

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**Visible Costs** 

Labour Materials Overheads

**Hidden Losses** 

Poor Plant Reliability and Performance

Wasted Time and Resource through Inefficient Processes

Poor Teamwork and Communication between Functional Groups

Easily Measured

**Limited Profit Potential** 

Not Generally Measured

High Profit Potential



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**Evaluate importance of bottom level functions** 

**Evaluate loss of function** and probability of occurring

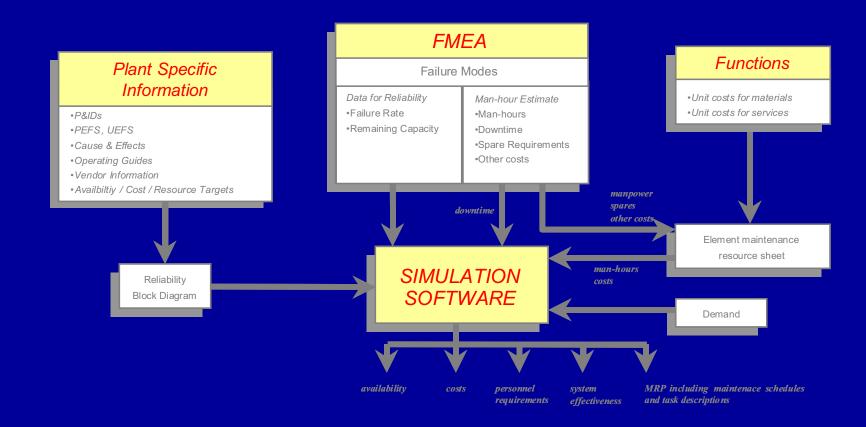
**THEN** 

Plan and develop the level of analysis

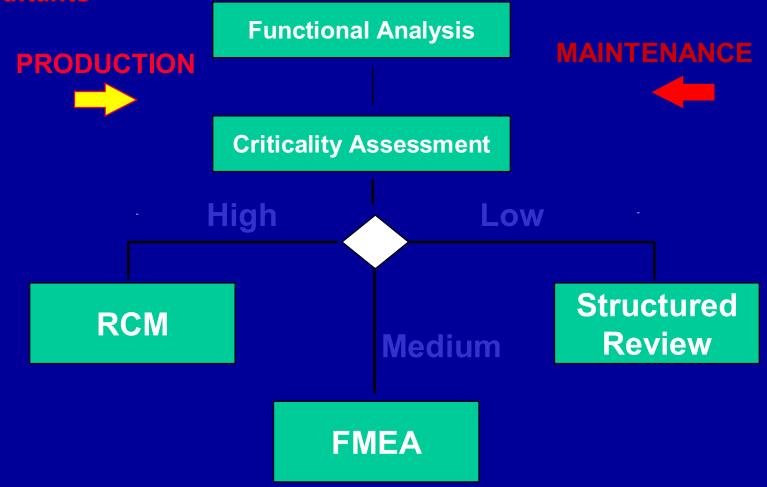




## RAM Approach

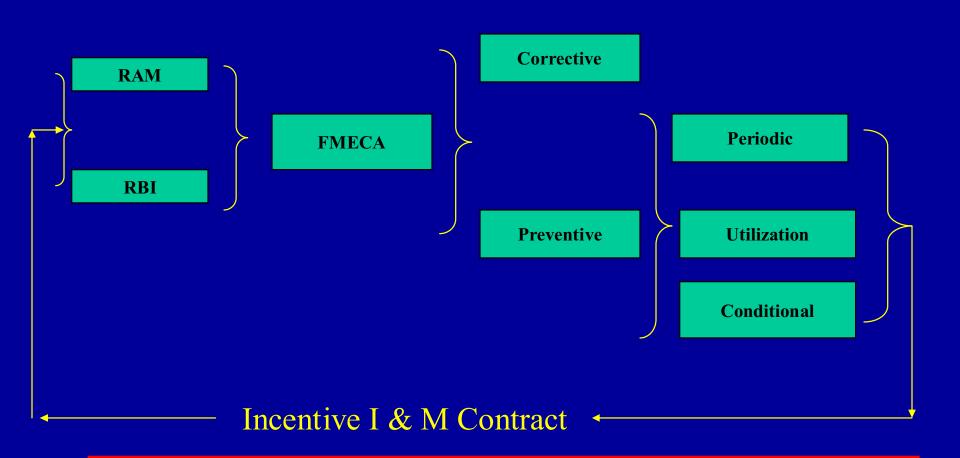








### RCM



## RBI/RCM References

- Probabilistic Corrosion Analyses Flowlines NAM
- RBI/RCM Offshore Platforms NAM
- Site Inspection BP Refinery
- RCM program Elf Petroland
- Feasibility study implementation RBI TRN
- RBI inspection plan BP onshore gas facilities
- RBI/RCM Q4-C Platform Wintershall