

# Linking critical competencies with major accident hazards

## Hazards 31 Conference

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IChemE ADVANCING CHEMICAL ENGINEERING WORLDWIDE

# Hazards31

Industrial Tribology and Materials Engineering

Space and Vacuum Tribology

Safety & Risk Management

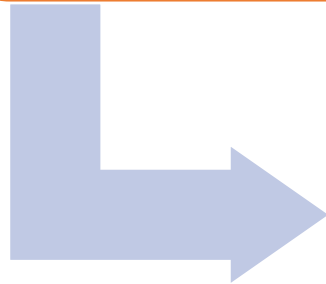
Good Practice Non-Destructive Testing



- Core services include:
  - Development and Review of Safety Cases
  - Major hazard quantitative risk assessment
  - Consequence modelling, including Computational Fluid Dynamics
  - Technical safety assessments
  - Fire engineering, including 3D fire and gas detector mapping
  - Workshop facilitation (HAZID, ALARP, Bow-Tie, etc.)
  - Reliability assessments
  - Ageing plant management
  - Independent review and expert witness

# Introduction

Competence  
is important



But....

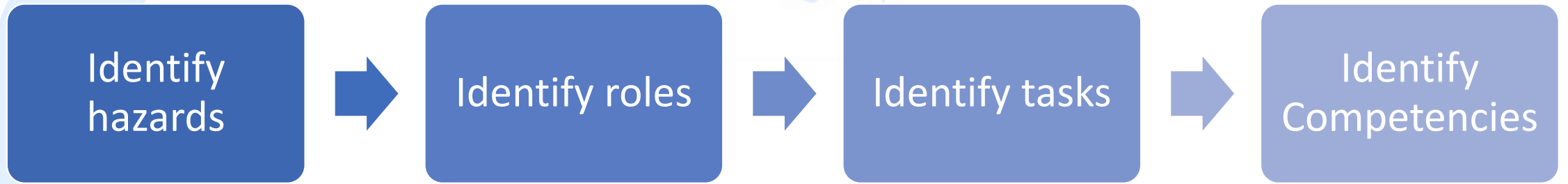
Everything can  
contribute to the  
risk therefore we  
can't see the wood  
for the trees



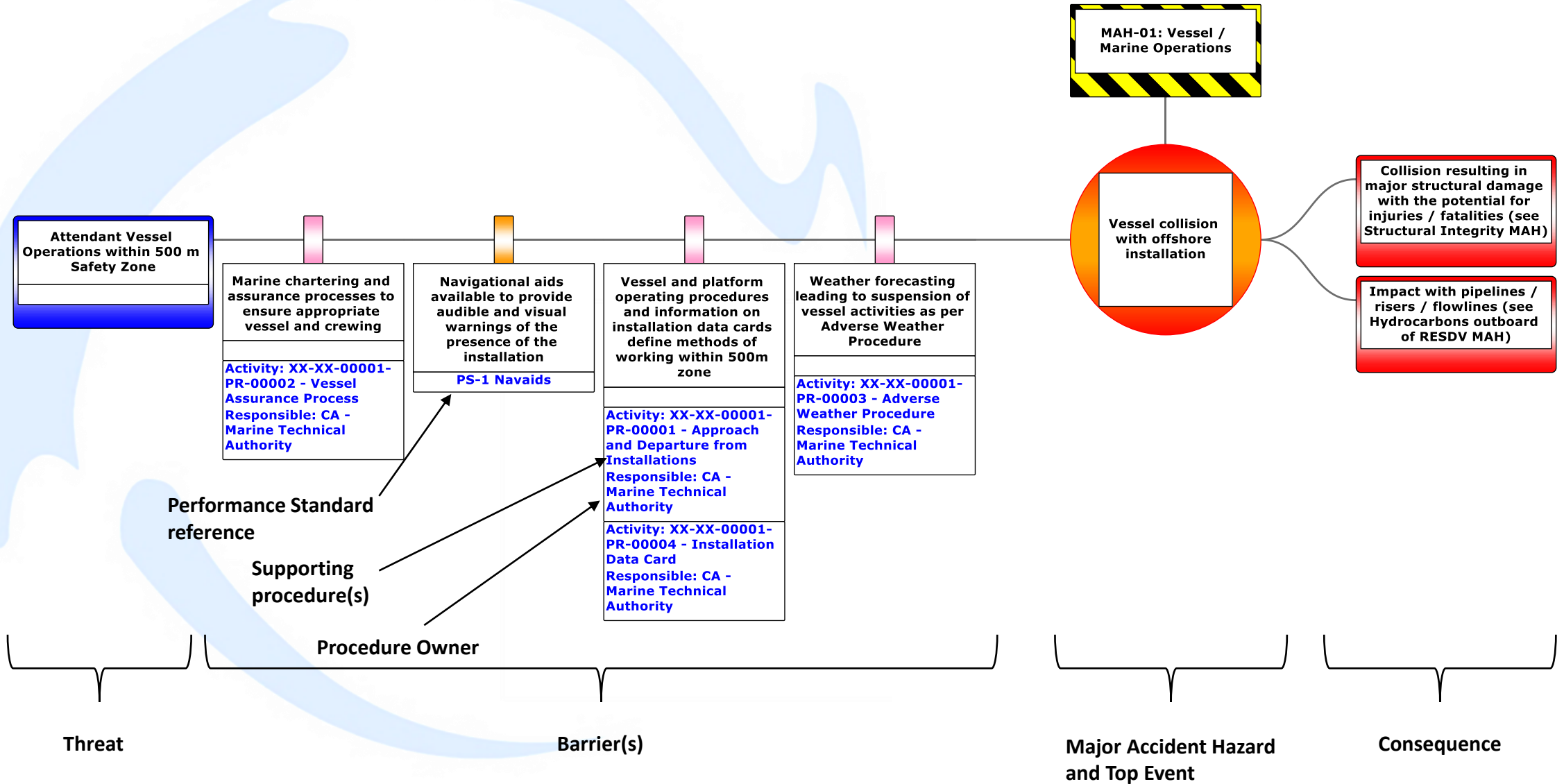
Training  
course

The role and  
associated  
competencies of  
senior managers,  
including Technical  
Authorities, is often  
overlooked

# Typical approach to Competence Management



# Identify Hazards



# Procedure Types

Broadly:

1. A management process e.g. MOC, ER
2. Covering a physical process e.g. isolating and reinstating plant.

# Identify Roles

## Senior Management

Accountable for major accident hazard management

## Technical Authority

Typically, although not always, the procedure owner

## Discipline Engineer (office based work)

Typically the procedure author

## Discipline Engineer (site based work)

Examples include  
Responsible Person  
Electrical, Integrity Engineer,  
Health and Safety Advisor, etc.

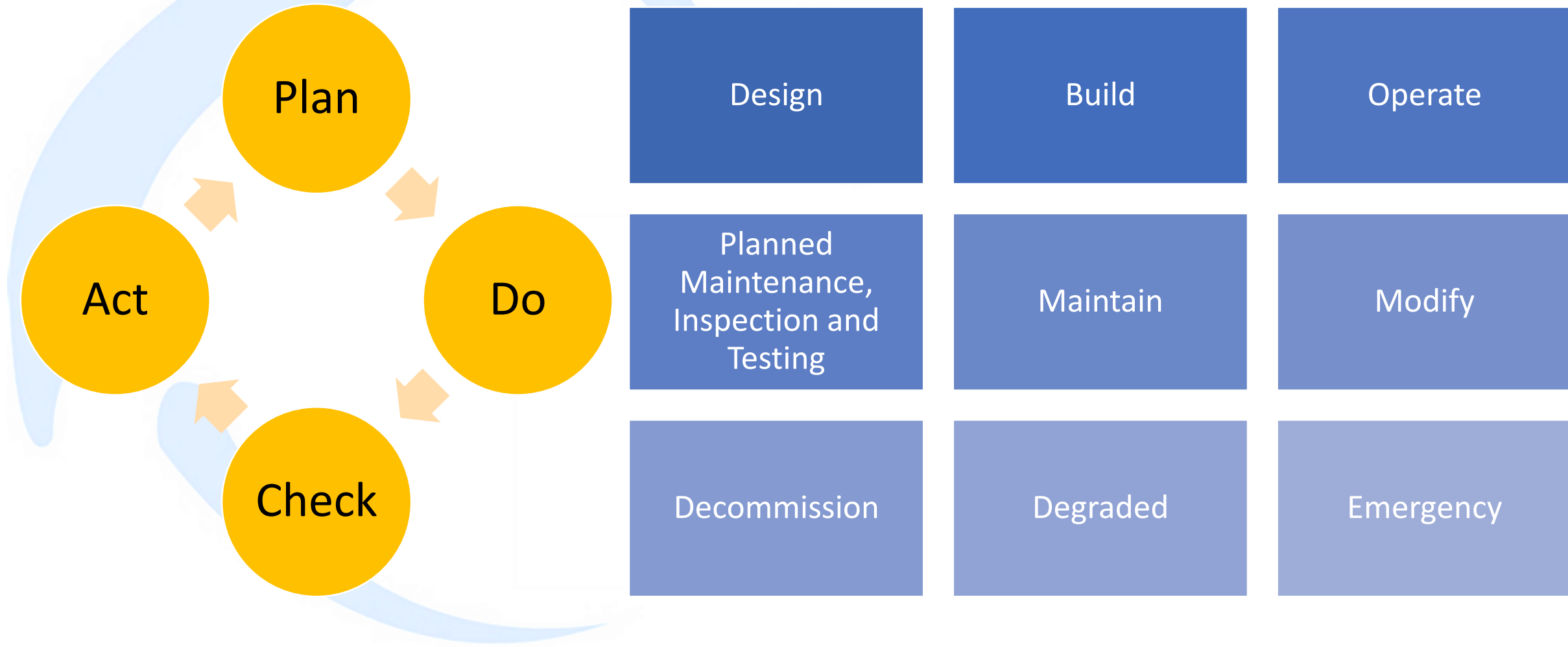
## Site Supervision

The person responsible for supervising the task

## Technician

The person responsible for carrying out the task

# Identify Tasks - Approach





# Identify Tasks - Approach

Lifecycle	Element			
	Plan	Do	Check	Act
<b>Design</b>	Define requirements & resources	Design to meet requirements	Verify requirements achieved	Approve for construction
<b>Operate</b>	Operating procedures & resources	Start-up, operate & shutdown to fulfil operational requirements	Operating envelope	Respond to events (e.g. alarms)
<b>Maintain</b>	Maintenance plans & resources	Repair/ replace	Return to service checks (e.g. leak check)	Evaluate planned MIT strategy
<b>Modify</b>	Plan change via Management of Change (MOC) process	Make change	Verify change as agreed	Evaluate change & update records
<b>Degraded</b>	Assess impact of degradation and develop strategy	Implement controls	Monitor system and controls	Continual review until degradation is rectified

# Example Task Output – PDCA Lifecycle

Lifecycle	Element			
	Plan	Do	Check	Act
<b>Design</b>	Define scope of Approach to and Departure from Installations procedure	Write the Approach to and Departure from Installations procedure	Confirm Approach to and Departure from Installations procedure is practical and effective	Endorse Approach to and Departure from Installations procedure
<b>Operate</b>	Recognise when the Approach to and Departure from Installations procedure shall be used - any vessel entry to the 500 metre Safety Zone	Follow Approach to and Departure from Installations procedure	Review and approve pre-entry checklist and monitor limits for operations (working location, heading, significant wave height, wind speed, visibility, etc.)	Troubleshoot, rectify, refuse entry
<b>Maintain</b>	Plan reviews to check information is up to date and procedure is keeping up with industry good practice (e.g. Procedure for Offshore Marine Operations (GOMO))	Review	Audit to confirm reviews are taking place and are effective	Update details if not current (following audit).
<b>Modify</b>	Ensure all changes to the procedure follow MoC	Update Approach to and Departure from Installations procedure	Complete MoC	Issue updated Approach to and Departure from Installations procedure
<b>Degraded</b>	Recognise that situations may exist where it is necessary for the vessel to operate on the windward side of the installation. Additionally, a failure may be revealed within the approach and departure checklist. In such situations a risk assessment shall be performed	Vessel Master and OIM approve risk assessment	Confirm mitigation measures are good enough	Continual review

# Example Competence Output – High-level Competencies

## Senior Management

- Understand that marine operations within the 500 metre Safety Zone are a Major Accident Hazard and understand how they are controlled in practice.
- Recognise where procedures sit within the hierarchy of risk controls (reliance of personnel to follow the procedure).

## Technical Authority

- Understand that marine operations within the 500 metre safety zone is a major accident hazard. In particular, knowledge is required of the installation's collision risk study.
- Knowledge of the implementation of the Approach to and Departure from Installations procedure – subject matter expert.
- Knowledge of applicable good practice regarding marine operations within the 500 metre safety zone, including relevant information to include within a marine data card.
- Ability to carry out audits.
- Incident investigation.
- Able to review and interpret marine related Failure Mode and Effect Analyses and Dynamic Positioning operational windows.

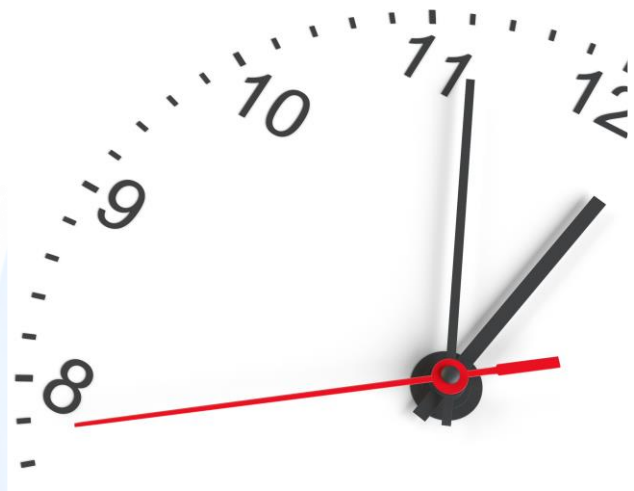
## Site Supervision

- Knowledge of the implementation of the Approach to and Departure from Installations procedure.
- Knowledge of risk assessment - understand that there may be periods when a vessel may have to work on the windward side of the installation or may suffer an equipment failure.
- Knowledge of the weather related trigger points within the Approach to and Departure from Installations procedure.
- Understand the criticality of installation based positioning reference aids, in particular that obstruction or movement could result in a loss of position.
- How to respond in an emergency situation when a vessel is approaching or departing

## Technician

- Able to monitor and interpret weather data (wind speed, visibility, significant wave height, etc.).
- Knowledge of the trigger points within the Approach to and Departure from Installations procedure.
- How to respond in an emergency situation when a vessel is approaching or departing.

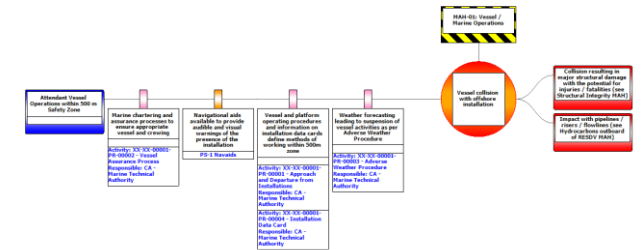
# Limitations



Time and resource



MAH awareness



Quality of Bow-Tie and Procedures

# Conclusions

