



Marine Risk Assessment (MRA); Awareness Workshop

CREaTE, Alor Gajah

Monday & Tuesday, 16th & 17th March 2020

*Presented by;
Capt. Subri Osman*

Knowing you....

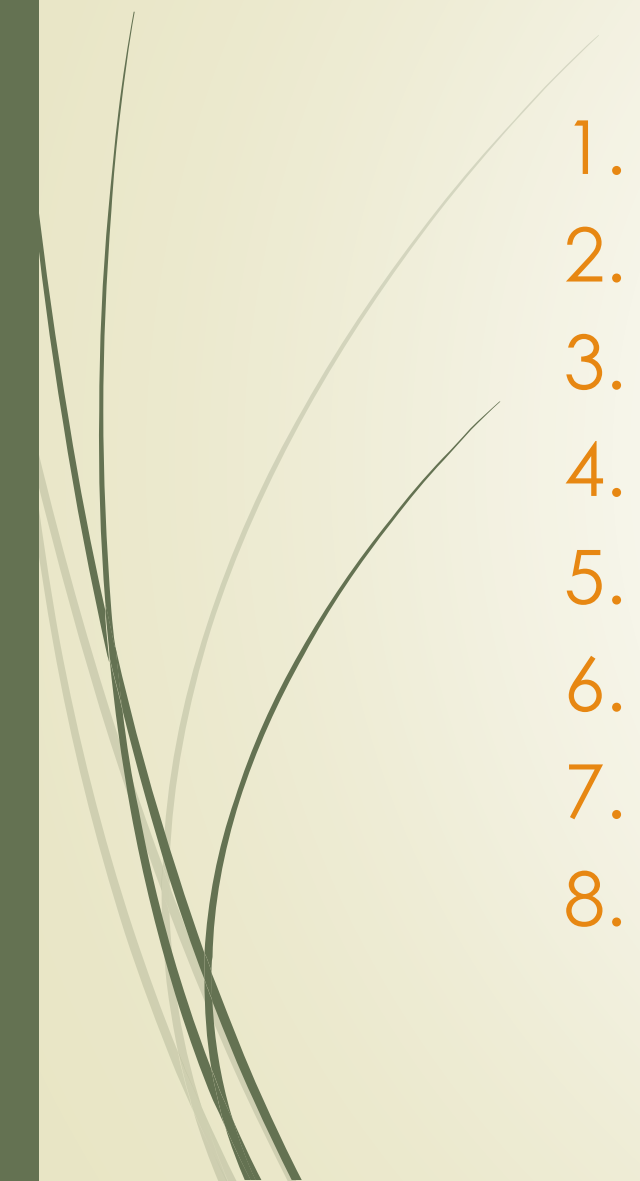
Please share your.....

- ✓ Name
- ✓ Age
- ✓ Organisation
- ✓ Your experience in RA
- ✓ Your expectation from the course





Contents

- 
1. Introduction
 2. Learning objectives
 3. Overview of Marine Risk Analysis
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Do it RIGHT at the first time

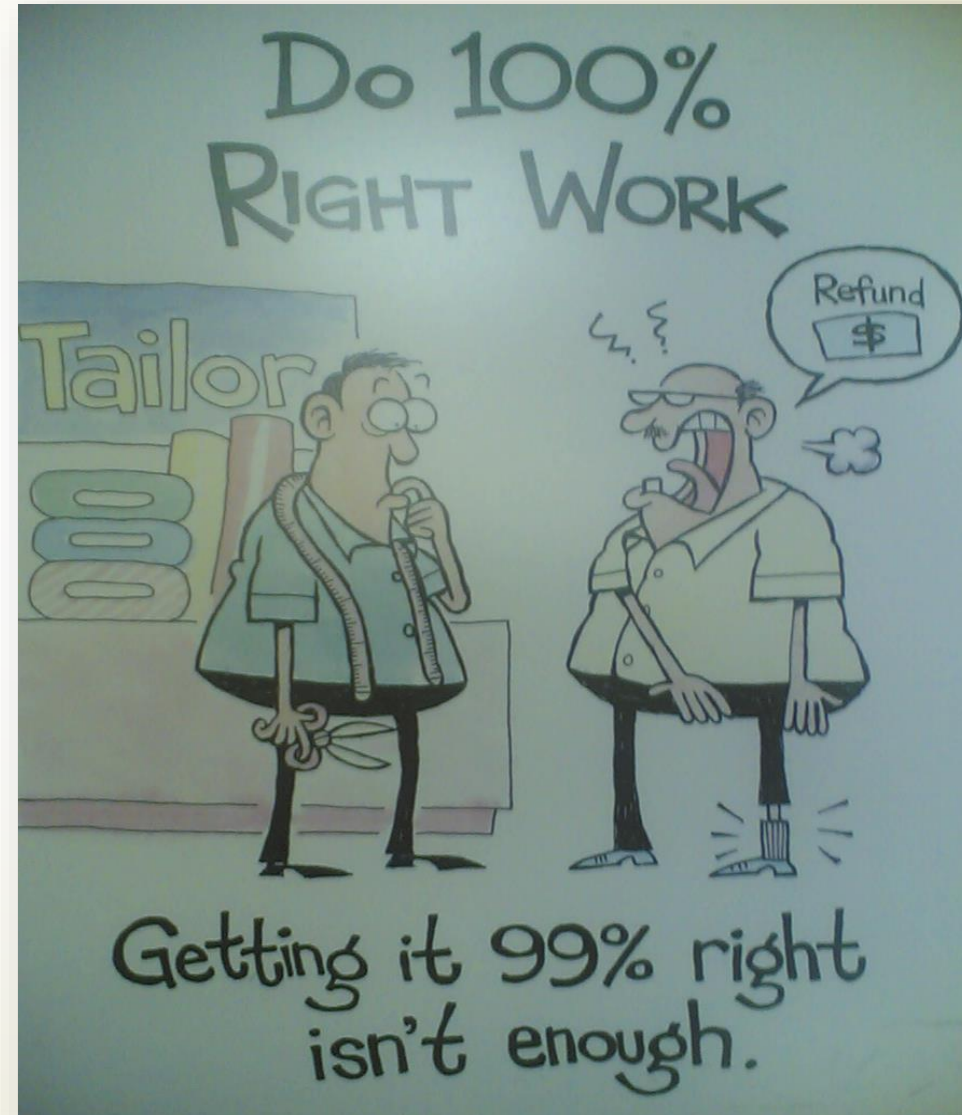


COLLECTIVE responsibility



QUALITY of your performance

*“Your **BEST**
is not enough
if there is still
a word called
EXCELLENT”*

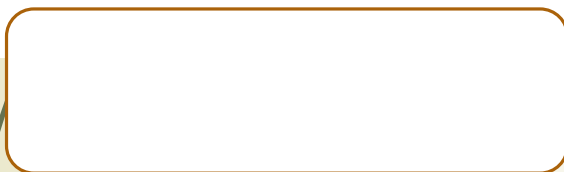




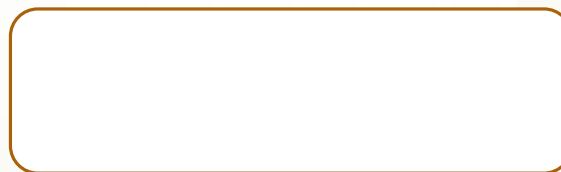
Learning Objective

1. General knowledge sharing and awareness of the Risk Management
2. Understand the legislative requirement of the MRA in Malaysia
3. Understand the MRA process
4. Understand the interpretation of Risk Matrix
5. Understand the development of Risk Register

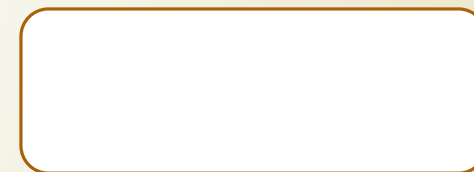
Introduction



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What needs to be done to the risk...





Risk defined

- ❑ Risk is the possibility that an event will **occur** and **adversely affect** the achievement of an objective.
- ❑ Risks do not need to be entirely **mitigated**; rather, they must be **managed** within the boundaries of an Organisation's risk appetite.

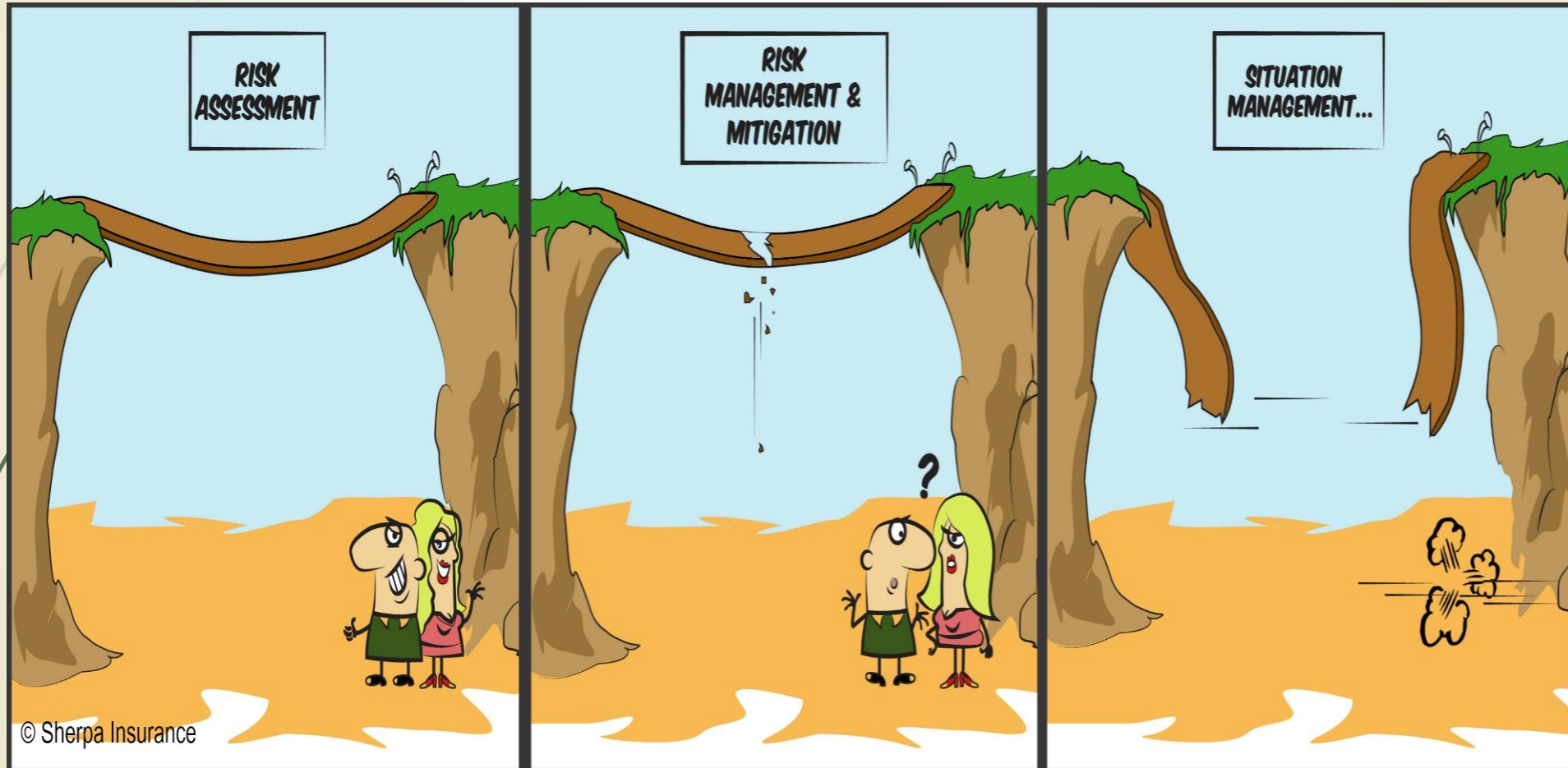


Risk Identification

What is the purpose of this phase ?

- ▶ The aims of this phase is to **identify , classify and prioritizing** the organization's information assets (know ourselves) and identify all important types and sources of risk and uncertainty (know our enemy), associated with each of the investment objectives.
- ▶ This is a crucial phase, if a risk is **not identified** it cannot be **evaluated and managed**.
- ▶ How to go to war **if we cannot identify the enemies?**

The analogy





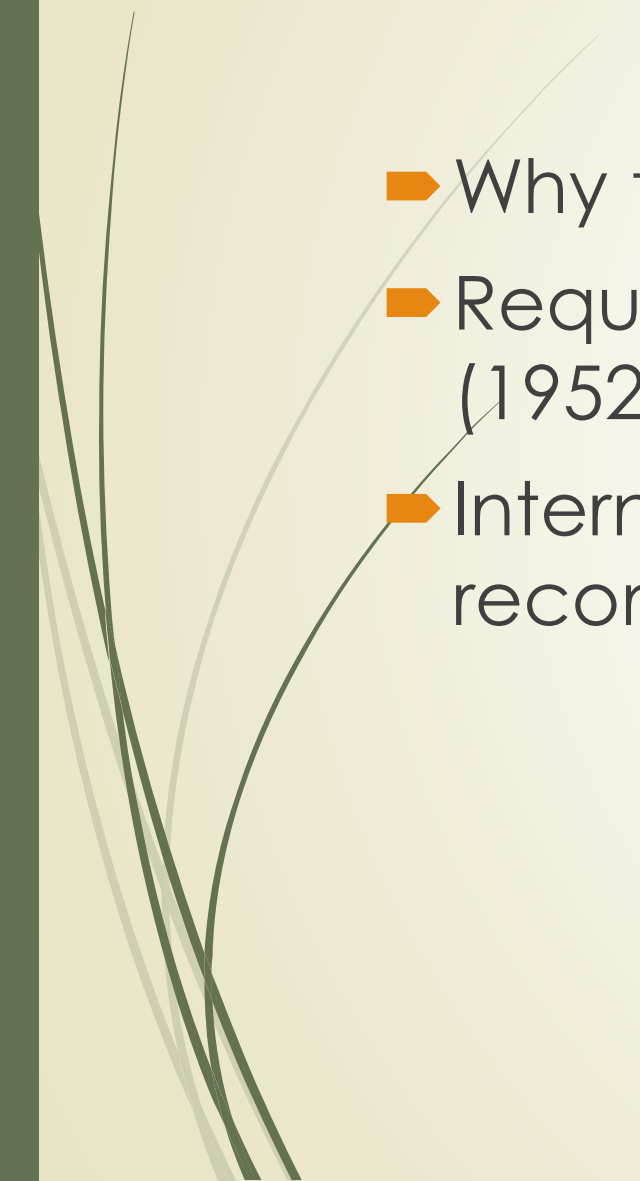
What is Hazard?

There are many definitions for hazard but the most common definition when talking about workplace health and safety is:

- ❑ A hazard is any **source of potential** damage, harm or adverse health effects on something or someone.



Overview of Marine Risk Analysis

- ▶ Why the needs of MRA?
 - ▶ Requirement of Merchant Shipping Ordinance (1952)
 - ▶ International Maritime Organisation (IMO) recommended Formal Safety Assessment (FSA)
- 

NPM 02/2019



NOTIS PERKAPALAN MALAYSIA MALAYSIAN SHIPPING NOTICE

NPM 02/2019
MSN 02/2019

JABATAN LAUT MALAYSIA

Ibu Pejabat Laut, Peti Surat 12, 42007 Pelabuhan Klang.
Tel: 03-33 467777 Fax: 03-3168 5289
E-mail: lpgr@marine.gov.my
<http://www.marin.gov.my>

KEPERLUAN PELAKSANAAN KAJIAN DAN PENILAIAN ANALISA RISIKO MARIN BAGI AKTIVITI MELIBATKAN KAPAL DI DALAM PERAIRAN MALAYSIA

MARINE RISK ASSESSMENT TO BE CONDUCTED FOR SHIP RELATED ACTIVITIES IN MALAYSIAN WATERS

Pemakluman kepada pemilik kapal, agensi perkapalan dan komuniti perkapalan.
Notification to shipowners, shipping agencies and shipping community

Notis ini adalah untuk memaklumkan bahawa Pengarah Laut akan menguatkuasakan keperluan menjalankan kajian dan analisa risiko marin ke atas semua aktiviti marin yang disenaraikan di bawah Seksyen 491B Ordinan Perkapalan Saudagar 1952 seperti berikut berkuatkuasa pada 15 Julai 2019.

- a. Penggerukan
- b. Pelombongan, termasuk penerokaan dan eksploitasi
- c. Pemasangan kabel dan paip
- d. Pembinaan marin, termasuk pembinaan jeti dan dermaga
- e. Pembuangan sebarang bahan
- f. Kerja Survei
- g. Aktiviti kapal ke kapal
- h. Berlabuh tunggu
- i. Apa jua bentuk operasi dasar laut

This notice serve to notify that the Director of Marine will impose the requirement to carry out a study and marine risk assessment on all activities listed under Section 491B of the Merchant Shipping Ordinance as per following with effective into force on 15th July 2019.

- a. Dredging
- b. Mining, including exploration and exploitation
- c. Cable and pipe laying
- d. Marine construction, including the construction of jetties and wharves
- e. Dumping of any material
- f. Survey
- g. Ship-to-ship activity
- h. Laying up
- i. Any forms of underwater operations

Marine Department MRA FAQs

➤ Apakah yang dimaksudkan dengan Kajian Penilaian Risiko Marin (MRA)?

- Kajian penilaian risiko merupakan suatu proses yang kompleks bagi mengenalpasti punca sesuatu risiko serta mengetahui kekerapan, kesan dan akibat sesuatu risiko itu. Pengenalpastian ini penting bagi menghurai strategi pengurusan risiko dalam meningkatkan keselamatan di laut dengan langkah pencegahan serta kawalan yang sewajarnya.
- Bagi tujuan MRA ini, IMO telah membangunkan IMO Formal Safety Assessment (FSA) yang mengandungi metodologi yang sistematik dan berstruktur untuk meningkatkan keselamatan di laut berdasarkan analisis dan pengurusan risiko yang cekap.
- IMO-FSA ini merupakan maklumbalas IMO berkenaan keperluan pendekatan moden dalam mewujudkan peraturan meningkatkan keselamatan di laut.



Cont'd...

- **Adakah Kajian Penilaian Risiko Marin (MRA) perlu dilaksanakan di Malaysia?**

- Ya, berdasarkan **Seksyen 491B, Ordinan Perkapalan Saudagar (MSO)** dan rujukan kepada **Notis Perkapalan Malaysia (NPM) 02/2019**.

Why needs MRA?

3 main reasons as to why it is important to carry out risk assessment;

1 It is financially beneficial as it helps to reduce injuries and accidents

2 It is regulatory requirement (ISM Code 1.2.2.2) and thus legally required

3 it is morally and ethically right thing to do as risk assessment helps in preventing injuries and accidents

What the Rules say?

- IMO – FSA to be carried out; **MSC-MEPC.2/Circ.12/Rev.1**
Dated 18th June 2015
- Regulated by Marine Department Malaysia.
- Merchant Shipping Ordinance 1952 **ACT A1316 (2008); Section 491B.**
- Marine Risk Assessment (MRA) to be carried out for any construction or STS transfer operations.
- Hazard Identification (HAZID) workshop to be conducted for the location.

Benefits of MRA

➡ **HAZID and Risk Assessment will help to;**

1. Recognise and control hazards
2. Create awareness among the personnel, can be used as training tools
3. Set risk management standards, based on acceptable safe practices and legal parameters
4. Reduce incidents at the workplace
5. Save costs by being proactive instead of reactive

How to do it?

- There are no fixed rules on how a risk assessment should be carried out, but there are a few general principles that should be followed.
- **The 5 steps are:**
 1. Identify the hazards
 2. Decide who might be harmed and how
 3. Evaluate the risks and decide on control measures
 4. Record your findings and implement them
 5. Review your assessment and update if necessary

Risk Assessment formula

$$\text{Risk} = \text{Consequence} \times \text{Probability}$$

Consequence:

- these can be calculated
- they include severity
- they can be accurately measured

Probability:

- these are readily available from manufacturers of products, from generic databases, from your own databases, etc.



The Assessment Process

HAZARDS

- Accident
- Fire
- Explosion
- Hazardous materials spill or release
- Terrorism
- Workplace violence
- Pandemic disease
- Utility outage
- Mechanical breakdown
- Supplier failure
- Cyber attack

Hazard Identification

Likelihood & Impact

ASSET AT RISK

- People
- Property including building, critical structure etc.
- Supply chain
- Systems / Equipment
- Business operations
- Reputation of or confidence in entity
- Regulatory and contractual obligations
- Environment

Vulnerability Assessment

Vulnerability

IMPACTS

- Casualties
- Property damage
- Business interruption
- Loss of customers
- Financial loss
- Environmental contamination
- Loss of confidence in the Organization
- Fines and penalties
- Lawsuits

Impact Analysis



Risk Exposures

At least identify the vulnerabilities to the following;

- People
- Asset / Property
- Environment
- Reputation



Hierarchy of Control

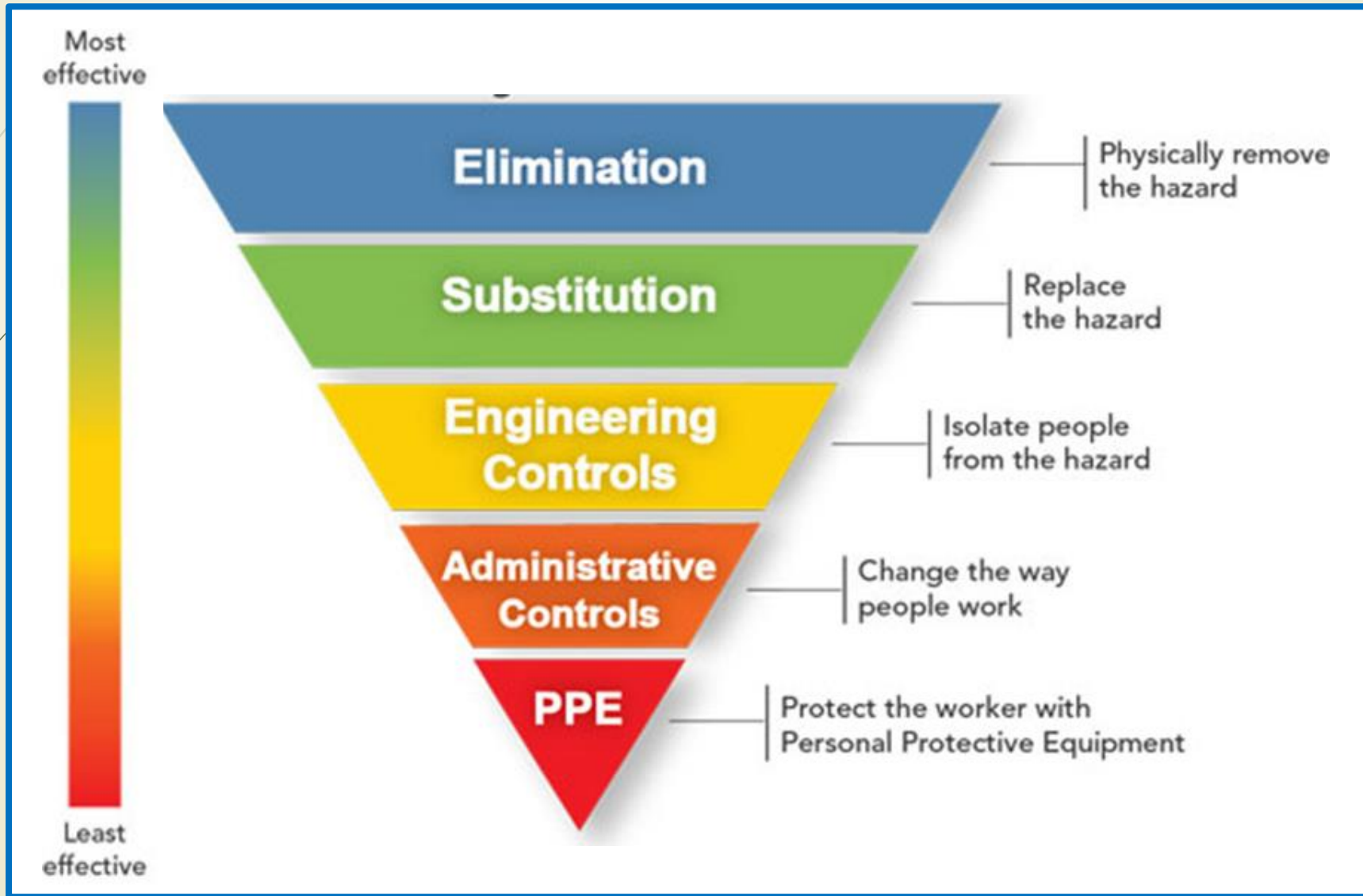
Control:

- **The measures** we take **to eliminate or reduce** the risk to an acceptable level.

Hierarchy of Control:

- **The order** in which **controls should be considered** when selecting methods of controlling a risk.

Cont'd...



Control Types

Preventive

Guidelines, Policies, Rules etc.



Detective

Audit, Reconciliation, Exception reports etc.



Corrective

Disciplinary actions, Action plan, Business continuity plan



Mitigation Types

Avoid

Prevent risk from even occurring



Reduce

Likelihood and/or Impact



Transfer

Outsource, Insurance etc.

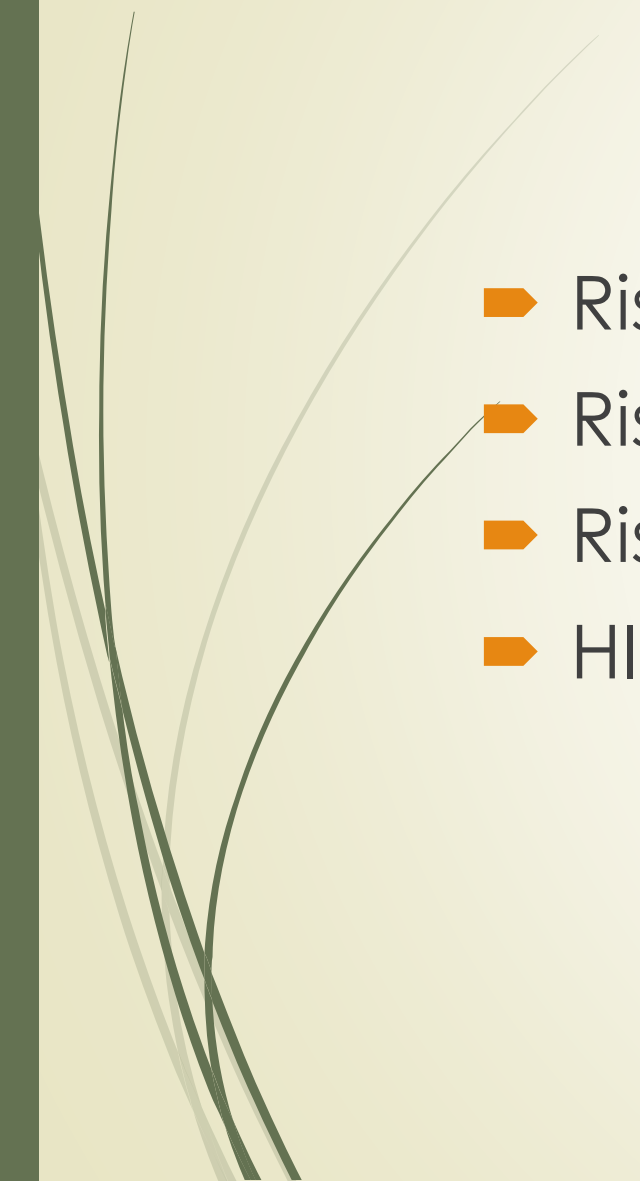


Accept

Self underwriting, monitor etc.



Risk management basics

- 
- Risk Analysis
 - Risk Assessment
 - Risk Matrix
 - HIRARC Reports / Risk Register

The Basic Process



What is Risk Analysis?

- The process of **identifying, assessing, and reducing** risks to an acceptable level;
 - Defines and controls threats and vulnerabilities
 - Implements risk reduction measures
- An analytic discipline with **three** parts;
 - i. **Risk assessment:** determine what the risks are
 - ii. **Risk management:** evaluating alternatives for mitigating the risk
 - iii. **Risk communication:** presenting this material in an understandable way to decision makers and/or the public



Benefits of Risk Analysis

1. Assurance that greatest risks have been **identified and addressed**
2. Increased **understanding** of risks
3. Mechanism for **reaching consensus**
4. **Support** for needed controls
5. Means for **communicating results**



Basic Risk Analysis Structure

1. Evaluate

- Value of computing and information assets
- Vulnerabilities of the system
- Threats from inside and outside
- Risk priorities

2. Examine

- Availability of countermeasures
- Effectiveness of countermeasures
- Costs (installation, operation, etc.) of countermeasures

3. Implement and Monitor



What is Risk Analysis?

- Risk Assessment is a systematic approach to identify hazards, evaluate risk and incorporate appropriate measures to manage and mitigate risk for any work process or activity.



What is Risk Assessment?

- **Analytical tool** for **studying situations** that could result in **adverse consequences**
- **Qualitative and quantitative** assessment of environmental status
- **Process to identify and quantify** the risk and select necessary action



What is it?

It is about **identifying sensible measures to control the risks in your workplace, comprising;**

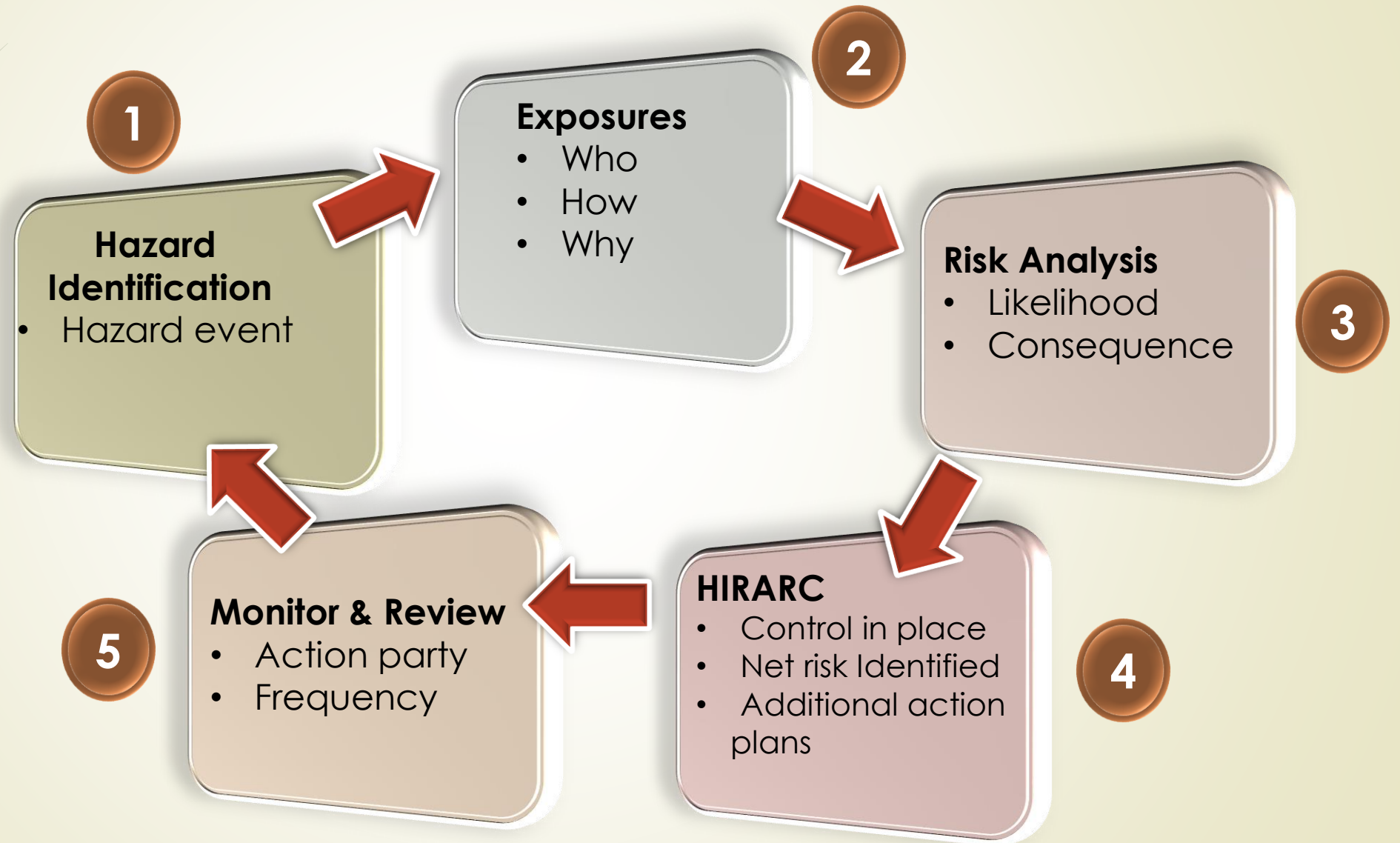
1. The **1st process** in **Risk Management** methodology
2. Used to **determine potential threats and associated risk**
3. Output of this process helps to **identify appropriate controls** to reduce or eliminate risk

RA methodology

- Risk assessment is a term used to describe the **overall process or method** where you:
 1. Identify hazards and risk factors that have the potential to cause harm (**hazard identification**).
 2. Analyze and evaluate the risk associated with that hazard (**risk analysis, and risk evaluation**).
 3. Determine appropriate ways to eliminate the hazard, or control the risk when the hazard cannot be eliminated (**risk control**).
 4. **To identify NET RISK.**



The Process





Steps of Risk Assessment

Step 1 : Identify the hazards

Step 2 : Decide who might be harmed and how

Step 3 : Evaluate the risks and decide on precautions

Step 4 : Record your findings and implement them

Step 5 : Review your assessment and update if necessary



Types of Risk Assessment

- Qualitative - (Use **Risk Matrix**)
 - table scales for **likelihood** and **severity**
 - Fatality
 - Major injuries
 - Minor injuries



Types of Risk Assessment

- Based on statistic : **Likelihood**
 - Very likely
 - Likely
 - Unlikely



Risk Matrix

- A matrix that is used during risk assessment to define the level of risk by considering the category of **probability or likelihood** against the category of **consequence severity**.
- This is a simple mechanism to **increase visibility** of risks and assist management decision making.

*Tommm cross the road
safely.....*



Scenario 1:

Crossing the road with only a bicycle passing by.



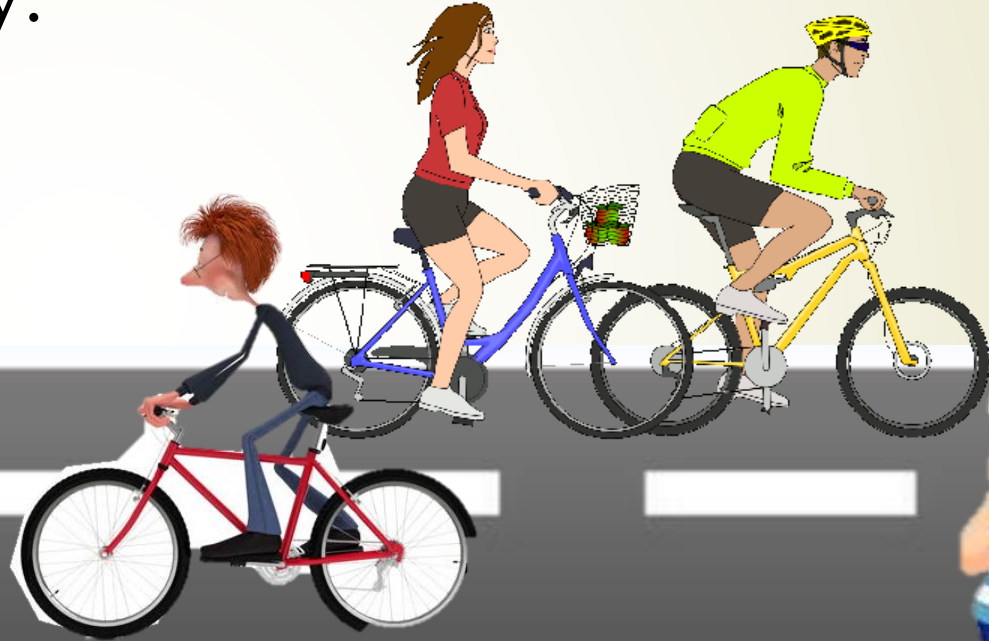
Likelihood =

Consequence =



Scenario 2:

Crossing the road with many bicycles passing by.

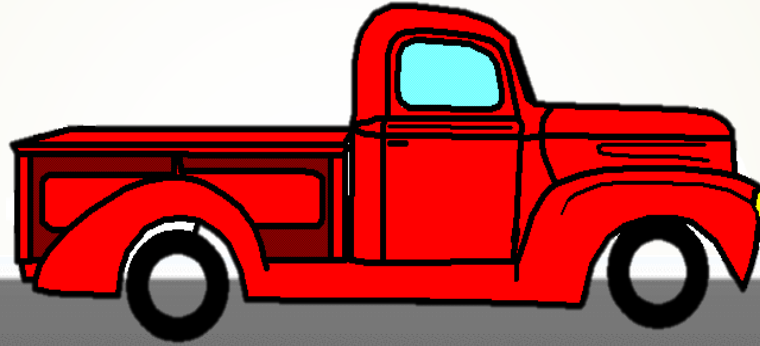


Likelihood =

Consequence =

Scenario 3:

Crossing the road with only one vehicle passing by.



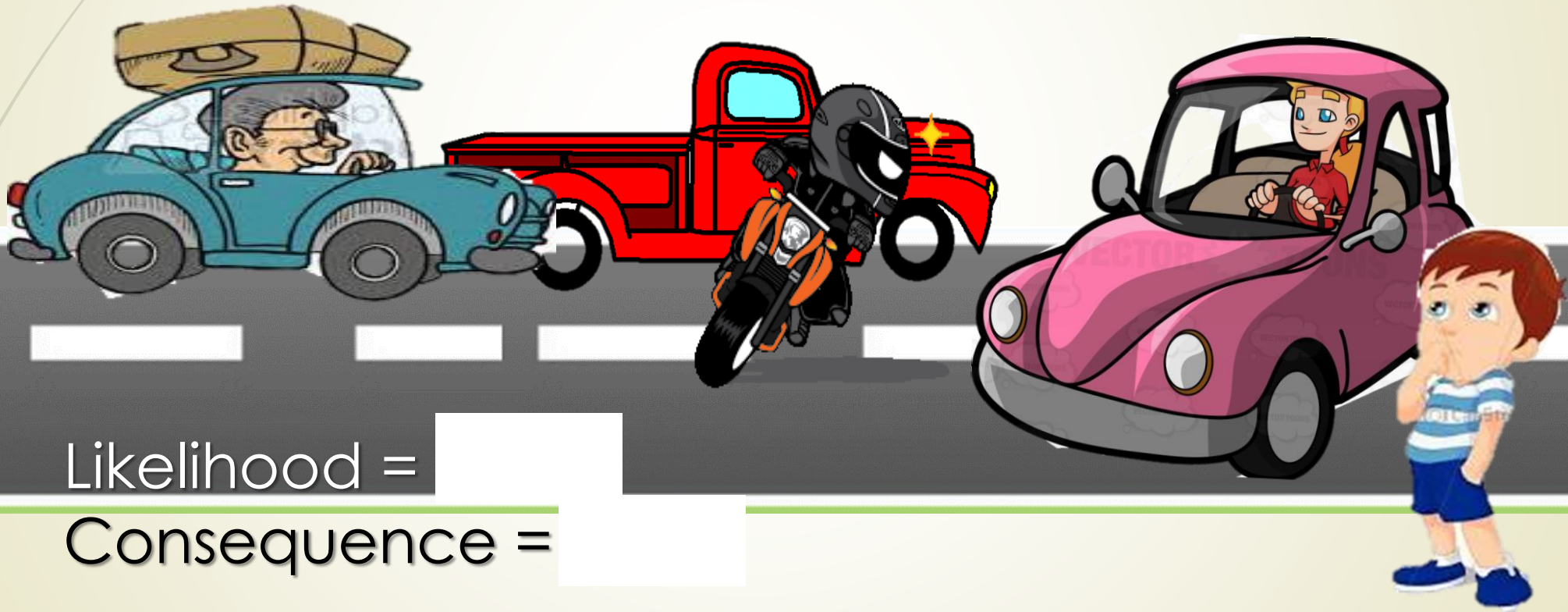
Likelihood =

Consequence =



Scenario 4:

Crossing the road with many vehicles passing by.



Likelihood =

Consequence =

Risk Assessment Matrix

Consequence / Impact				
Harm Vulnerability		LOW	MEDIUM	HIGH
	HIGH	S2		S4
	MEDIUM			
	LOW	S1		S3

Risk assessment for the boy to cross the road:

Risk rating;



Low Risk



Medium Risk



High Risk

Likelihood
Probability

Cont'd...

Likelihood	Severity			
	Catastrophic	Critical	Marginal	Negligible
Probable	High	High	Serious	
Occasional	High	Serious		
Remote	Serious	Medium		Low
Improbable				

Cont'd...

➤ Sample Risk Determination Matrix

		Impact		
		High	Moderate	Low
Likelihood	High	High	High	Moderate
	Moderate	High	Moderate	Low
	Low	Moderate	Low	Low

Cont'd...

		Impact →				
		Negligible	Minor	Moderate	Significant	Severe
Likelihood ↑	Very Likely	Low Med	Medium	Med Hi	High	High
	Likely	Low	Low Med	Medium	Med Hi	High
	Possible	Low	Low Med	Medium	Med Hi	Med Hi
	Unlikely	Low	Low Med	Low Med	Medium	Med Hi
	Very Unlikely	Low	Low	Low Med	Medium	Medium

Cont'd...

CONSEQUENCE					INCREASING PRIORITY				
Severity Rating	People	Assets	Environment	Reputation	A	B	C	D	E
					Rarely Occurred in E&P industry	Happened several times per year in industry	Has occurred in operating company	Happened several times per year in operating company	Happened several times per year in location
0	Zero Injury	Zero Damage	Zero Effect	Zero Impact	Manage for continual improvement				
1	Slight Injury	Slight Damage	Slight Effect	Slight Impact					
2	Minor injury	Minor Damage	Minor Effect	Limited Impact					
3	Major Injury	Local Damage	Local Effect	Considerable Impact	Incorporating risk reducing measures		Intolerable		
4	Single fatality	Major Damage	Major Effect	Major National Impact					
5	Multiple fatalities	Extensive Damage	Massive Effect	Major international Impact			Intolerable		



ALARP Principles

- “ALARP” is short for “as low as reasonably practicable”. The term means the concept of “reasonably practicable”; this involves weighing a risk against the trouble, time and money needed to control it.
- Describes the level to which we expect to see workplace risks controlled.

HIRARC report

Purpose of HIRARC

The purpose of HIRARC are as follows:-

- to **identify** all the factors that may cause harm to employees and others (the hazards);
- to **consider what the chances** are of that harm actually be falling anyone in the circumstances of a particular case and the **possible severity** that could come from it (the risks); and
- to enable employers to **plan, introduce and monitor preventive measures** to ensure that the risks are adequately controlled at all times.

Planning of HIRARC Activities

➤ HIRARC activities shall be plan and conducted:

a. for situation;

- i. where hazard appear to pose significant threat;
- ii. uncertain whether existing controls are adequate; or/and
- iii. before implementing corrective or preventive measures.

b. by organization intending to continuously improve OSH Management System.

➤ It should be the duty of the employer to assign a trained personnel to lead a team of employees associated with one particular process or activity to conduct HIRARC.



Risk rating and prioritization

- All risks must be **RATED** of the severity of impact to the Organisation.
- Senior Management should **prioritize** the risk in accordance to the **severity of impact** and their **risk appetite** respectively.

Risk Prioritization – Likelihood and Impact

LIKELIHOOD

Very High: Is almost certain to occur

High: Is likely to occur

Medium: Is as likely as not to occur

Low: May occur occasionally

Very Low: Unlikely to occur

Likelihood of a risk event occurring

IMPACT

Very High: Threatens the success of the project

High: Substantial impact on time, cost or quality

Medium: Notable impact on time, cost or quality

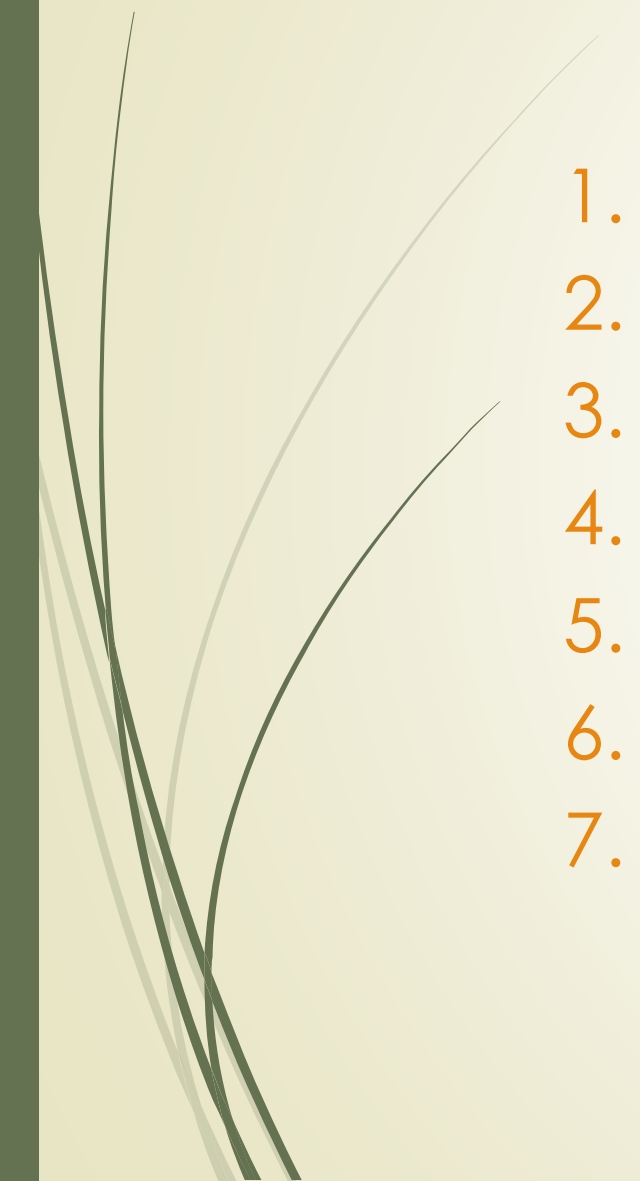
Low: Minor impact on time, cost or quality

Very Low: Negligible impact

Level of damage that can occur when a risk event occurs



Marine risk assessment process

- 
1. Data collection
 2. Information collation
 3. Area modelling and simulation studies
 4. HAZID workshop
 5. Report writing
 6. Report presentation
 7. Approving process

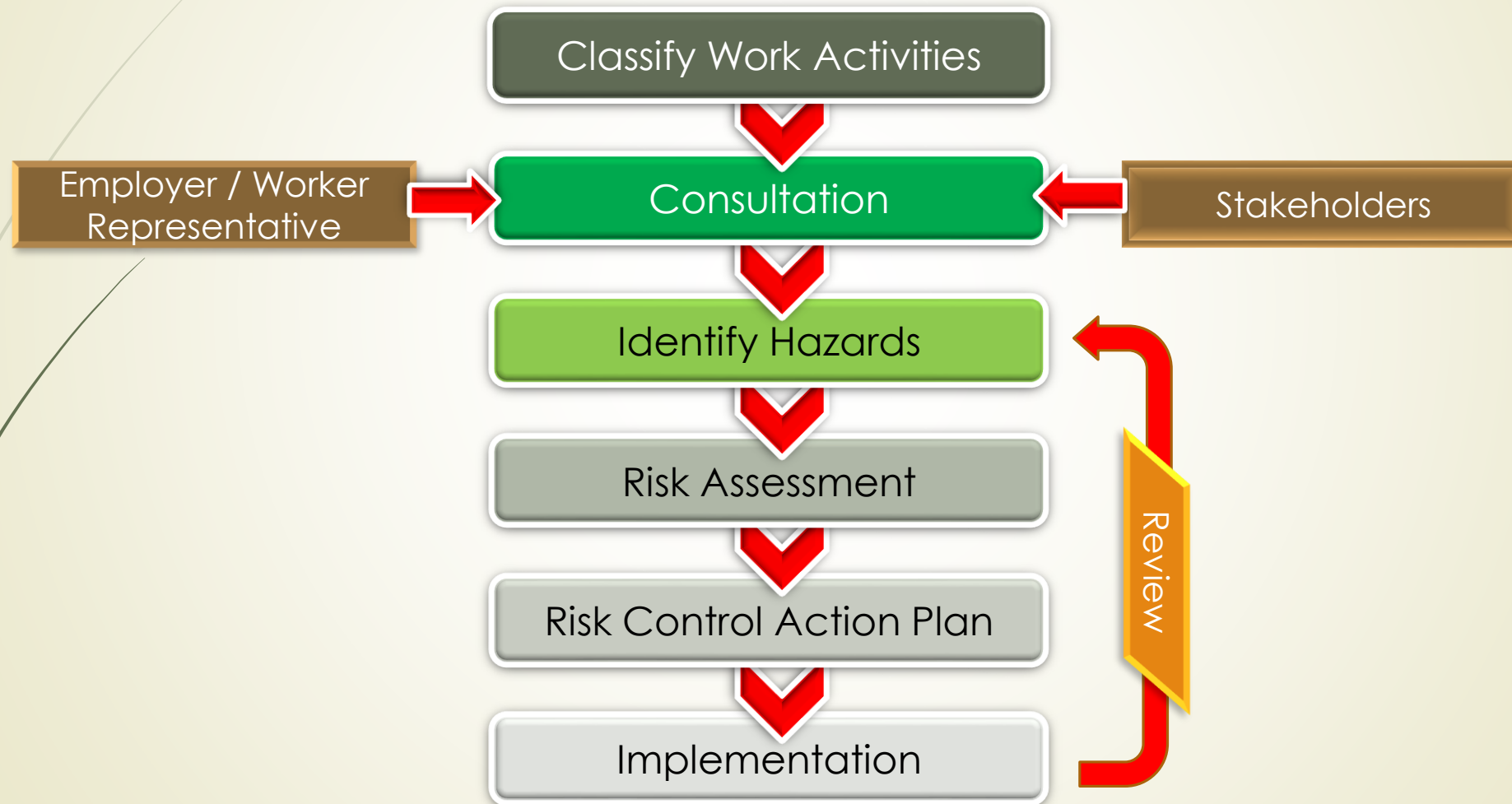


Process of HIRARC

Process of HIRARC requires 4 simple steps;

1. classify work activities;
2. identify hazards;
3. conduct risk assessment (analyze and estimate risk from each hazard), by calculating or estimating;
 - i. likelihood of occurrence, and
 - ii. severity of hazard;
4. decide if risk is tolerable and apply control measures as appropriate.

HIRARC Process Flowchart





Hazard identification technique

The employer shall develop a hazard identification and assessment methodology shall be developed taking into account the following documents and information;

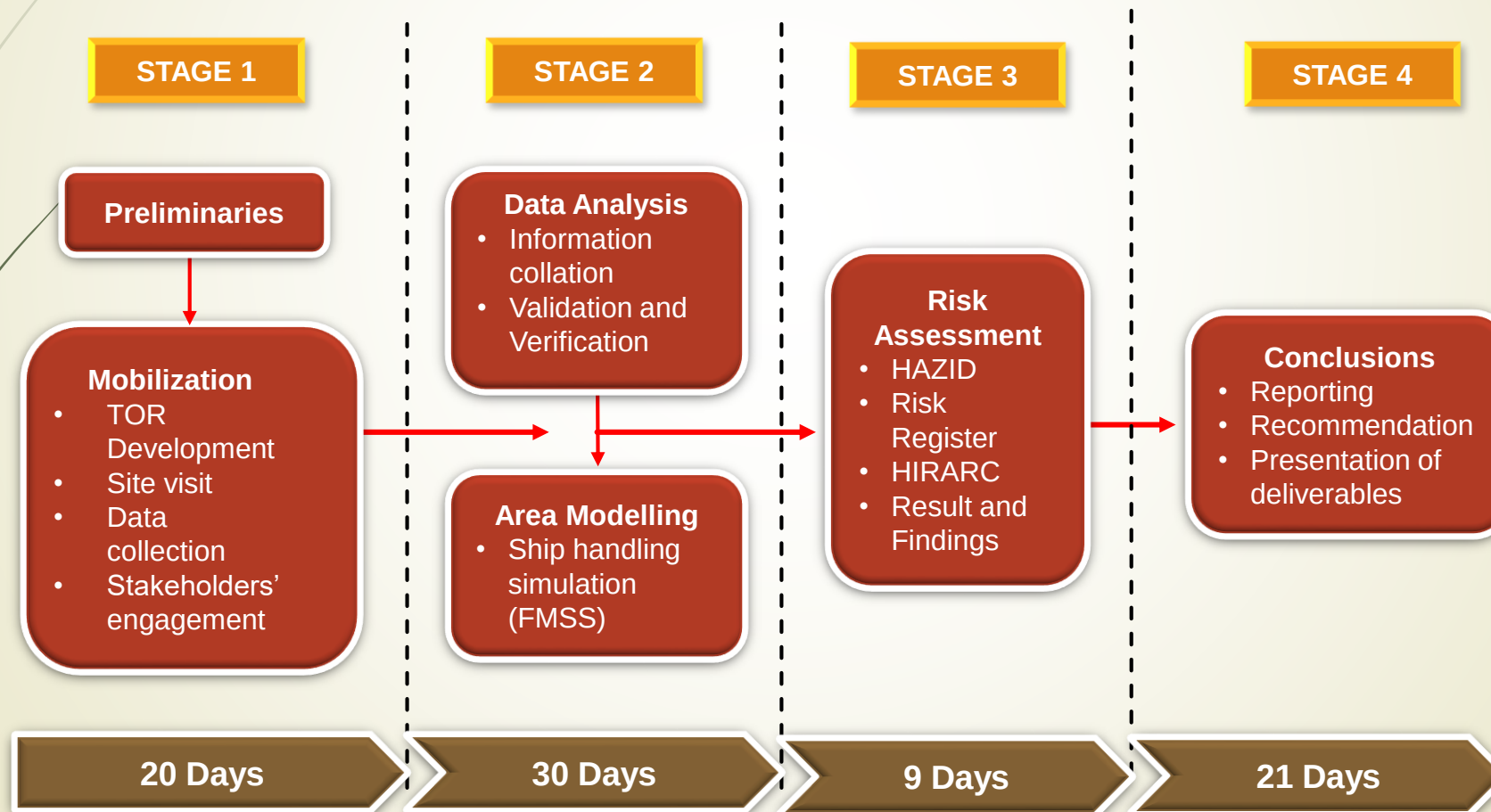
- ▶ any hazardous occurrence investigation reports;
- ▶ first aid records and minor injury records;
- ▶ workplace health protection programs;
- ▶ any results of workplace inspections;

Cont'd...

- ▶ any employee complaints and comments;
- ▶ any government or employer reports, studies and tests concerning the health and safety of employees;
- ▶ any reports made under the regulation of Occupational Safety and Health Act, 1994
- ▶ the record of hazardous substances; and
- ▶ any other relevant information.

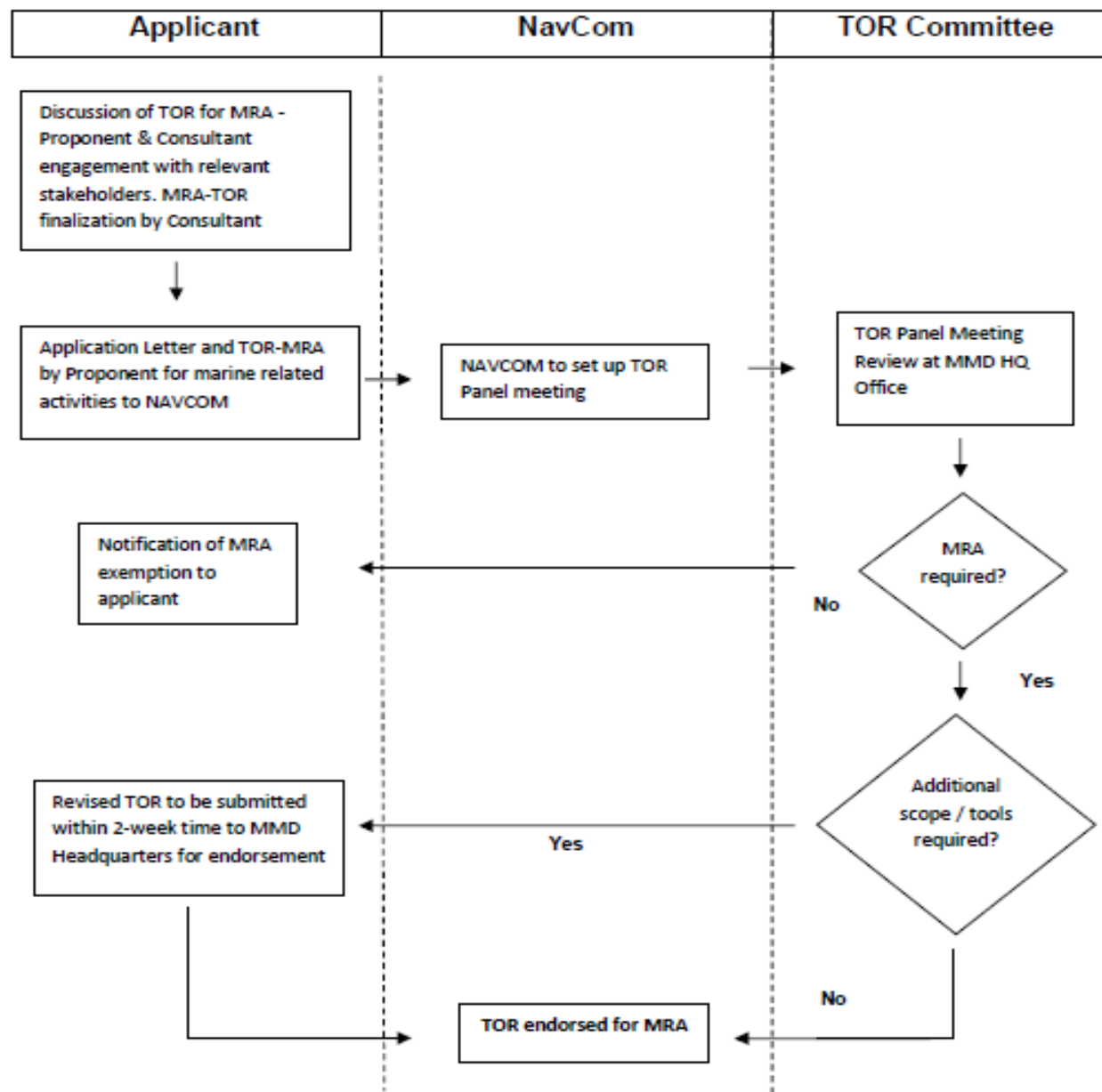
Methodology flow chart

Typical work methodology of a STS location MRA;



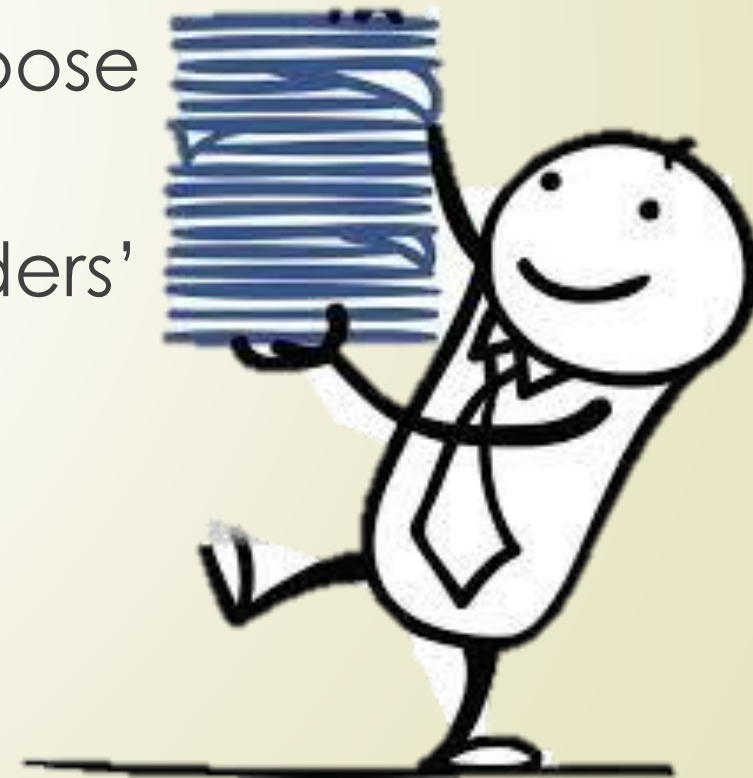
TOR Development

Procedure for the Identification of Term of Reference (TOR)



Data collection

- To determine the pertinent inputs, challenges, statistics, opinions for the analysis.
- To obtain relevant data for the purpose of area modelling as appropriate.
- Essentials via stakeholders' engagement.



Information collation

- Verification and validation of data.
- Complete analysis with bigger picture information.
- Basis for the simulation studies with various scenarios as appropriate.





Area modelling and simulation studies

- ▶ Simulates the real situation and condition of the proposed project area
- ▶ Opportunity to test the worst-case scenario in a controlled manner
- ▶ Ability to determine various parameter of the safe operations
- ▶ Identifies appropriate mitigation actions that include;
 - ERP
 - SOP
 - Contingency plan



Full Mission Ship Simulator



Full Mission Ship Simulator



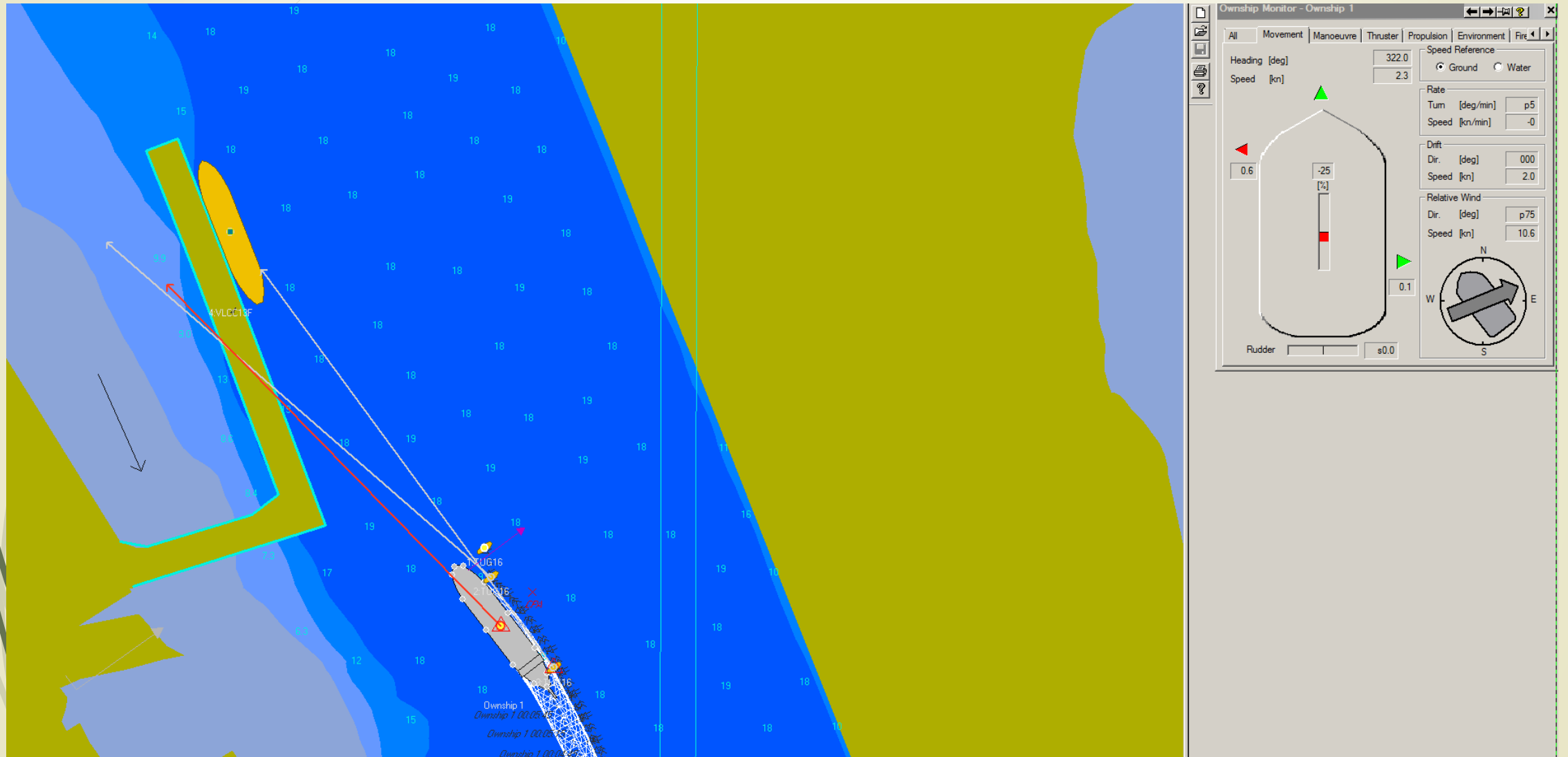
Full Mission Ship Simulator



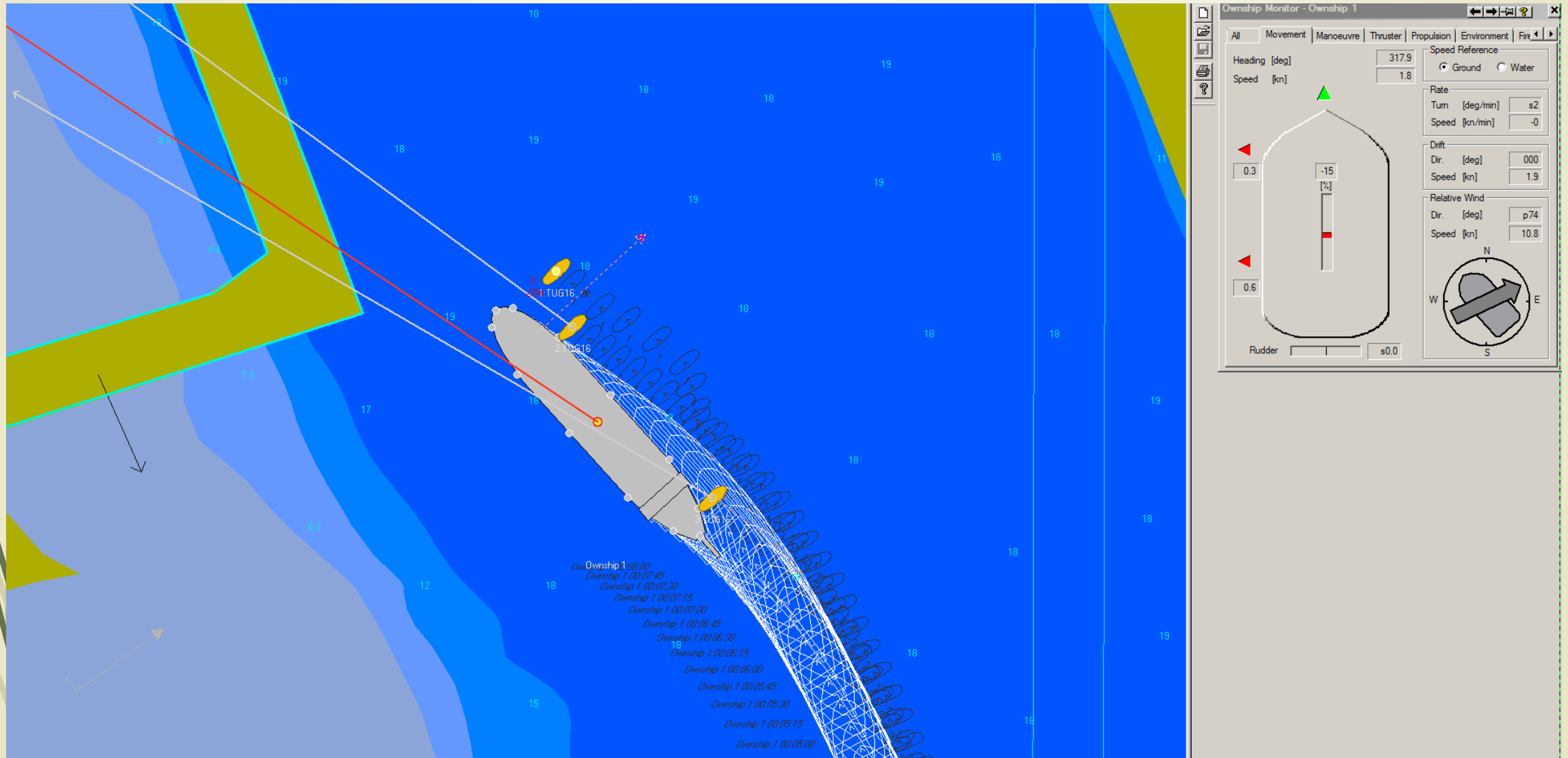
Full Mission Ship Simulator



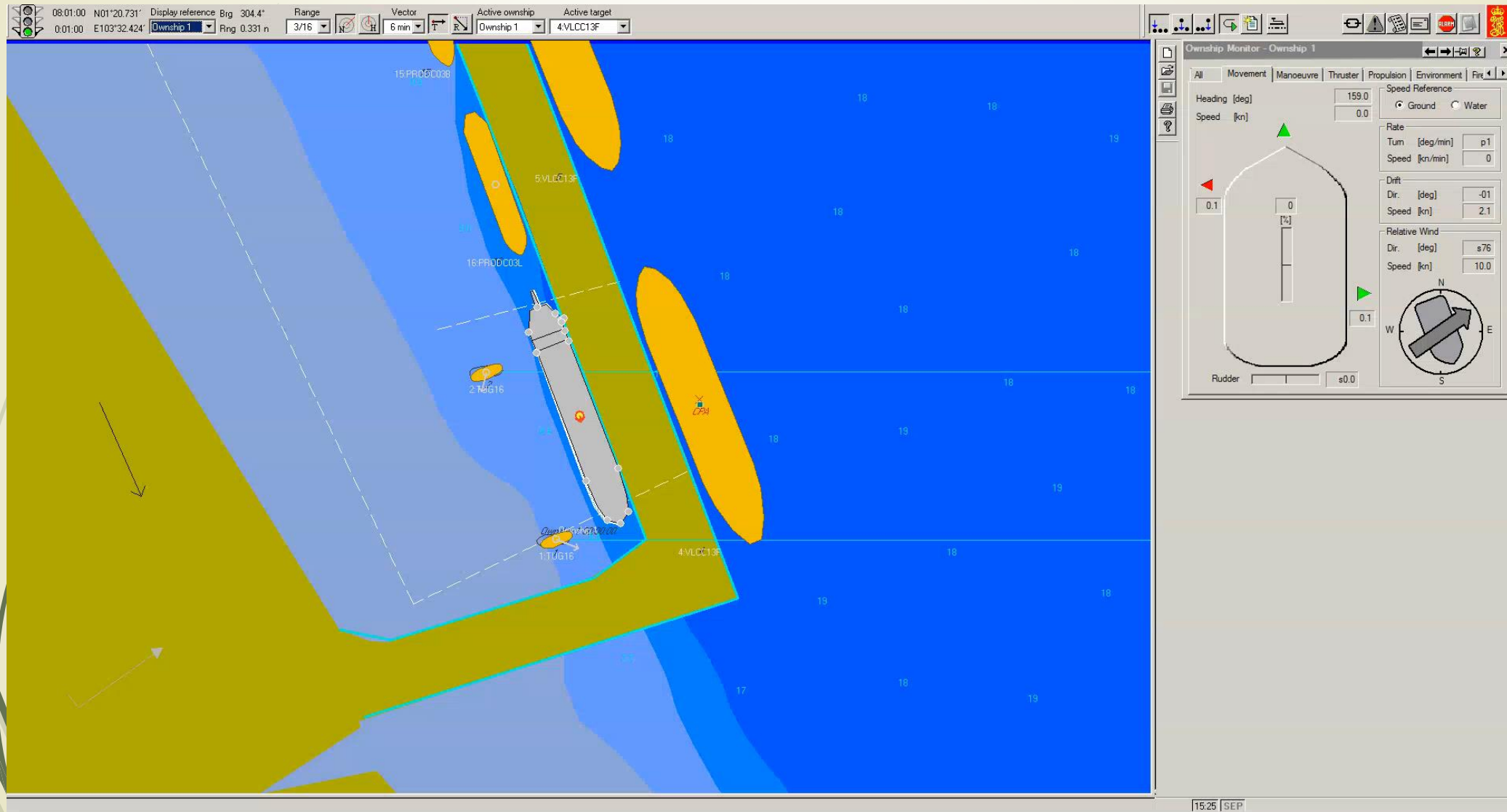
Ship handling tracking



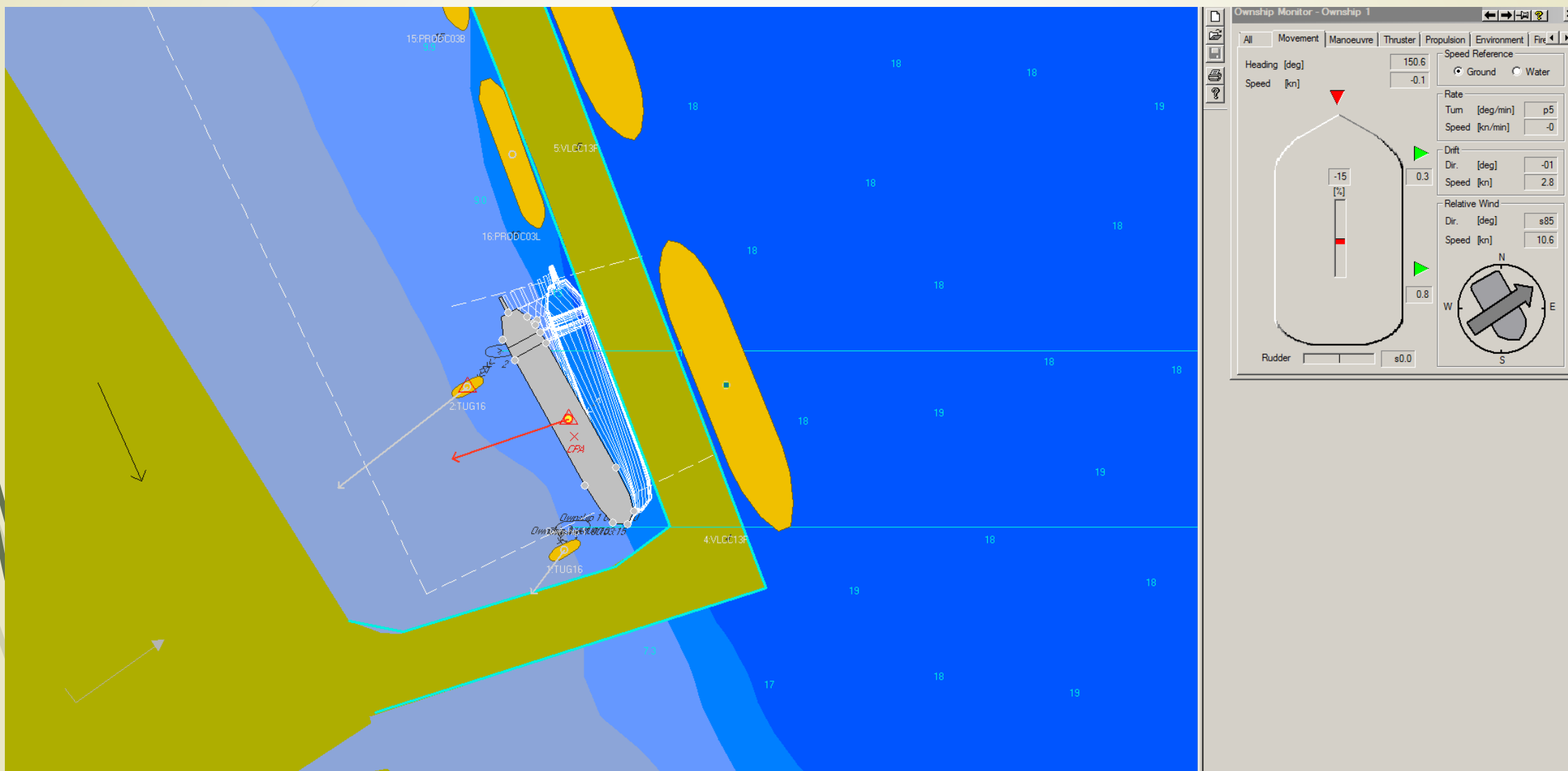
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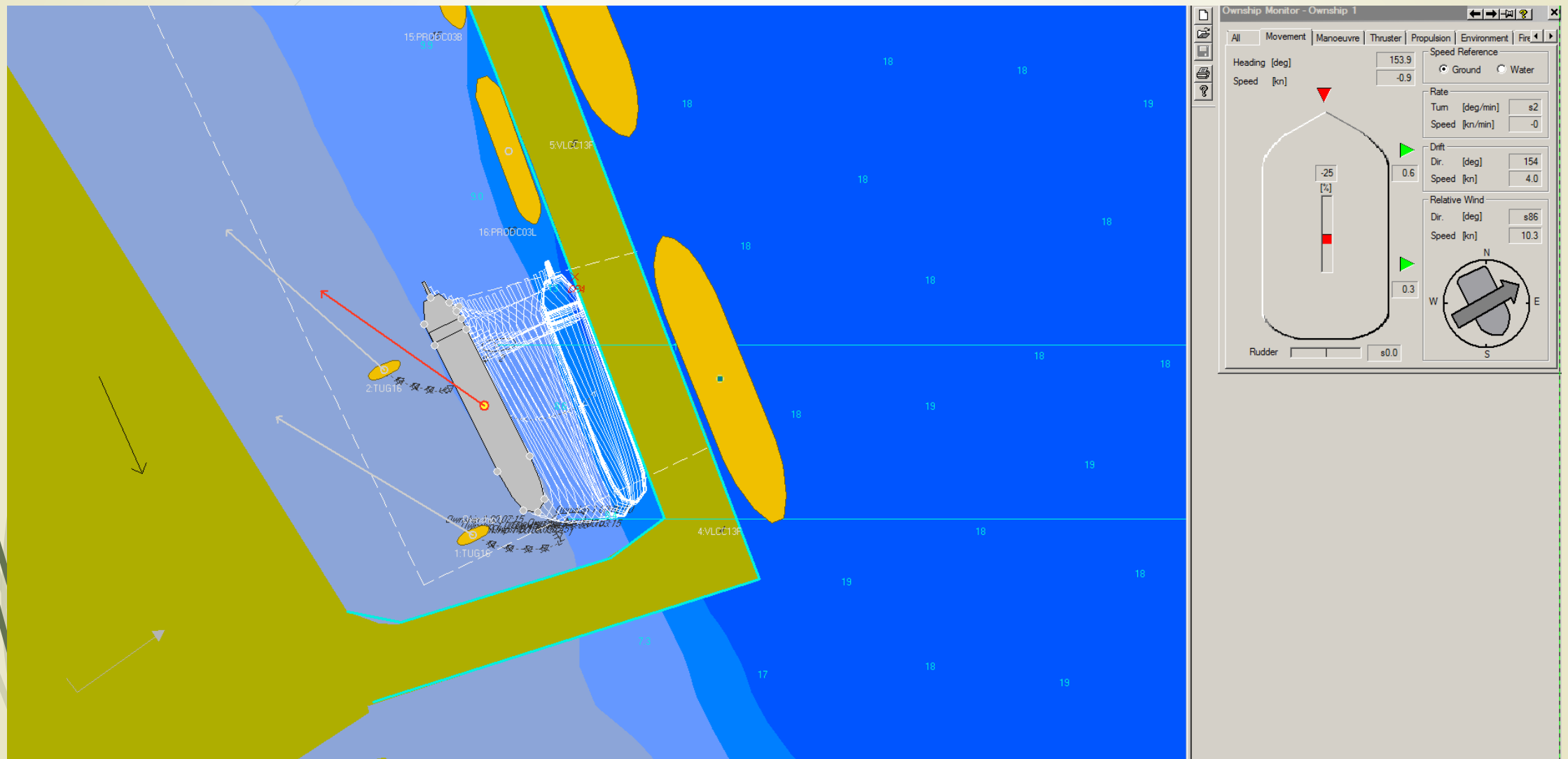
Ship handling simulation – Unberthing



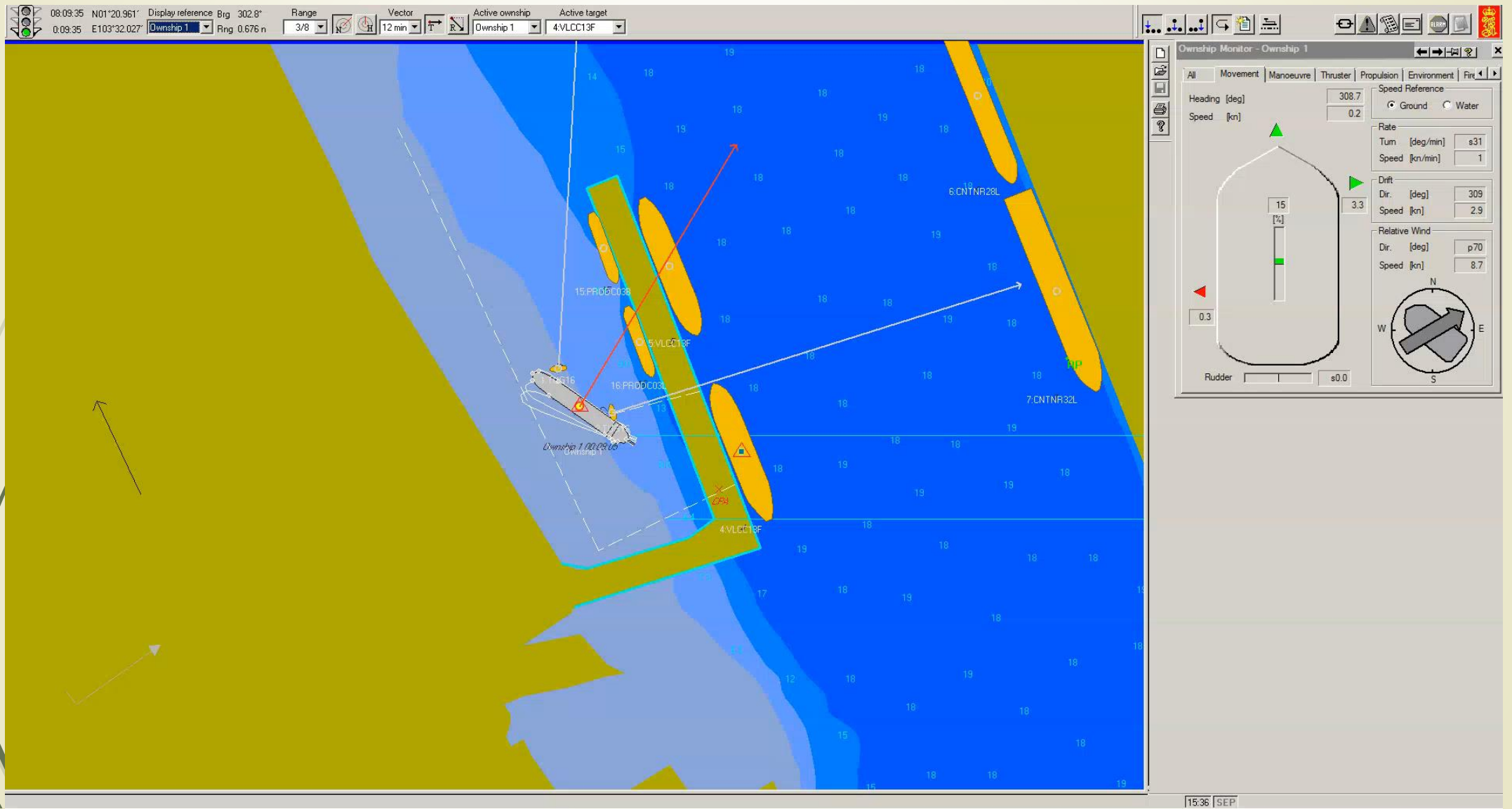
Ship handling simulation tracking



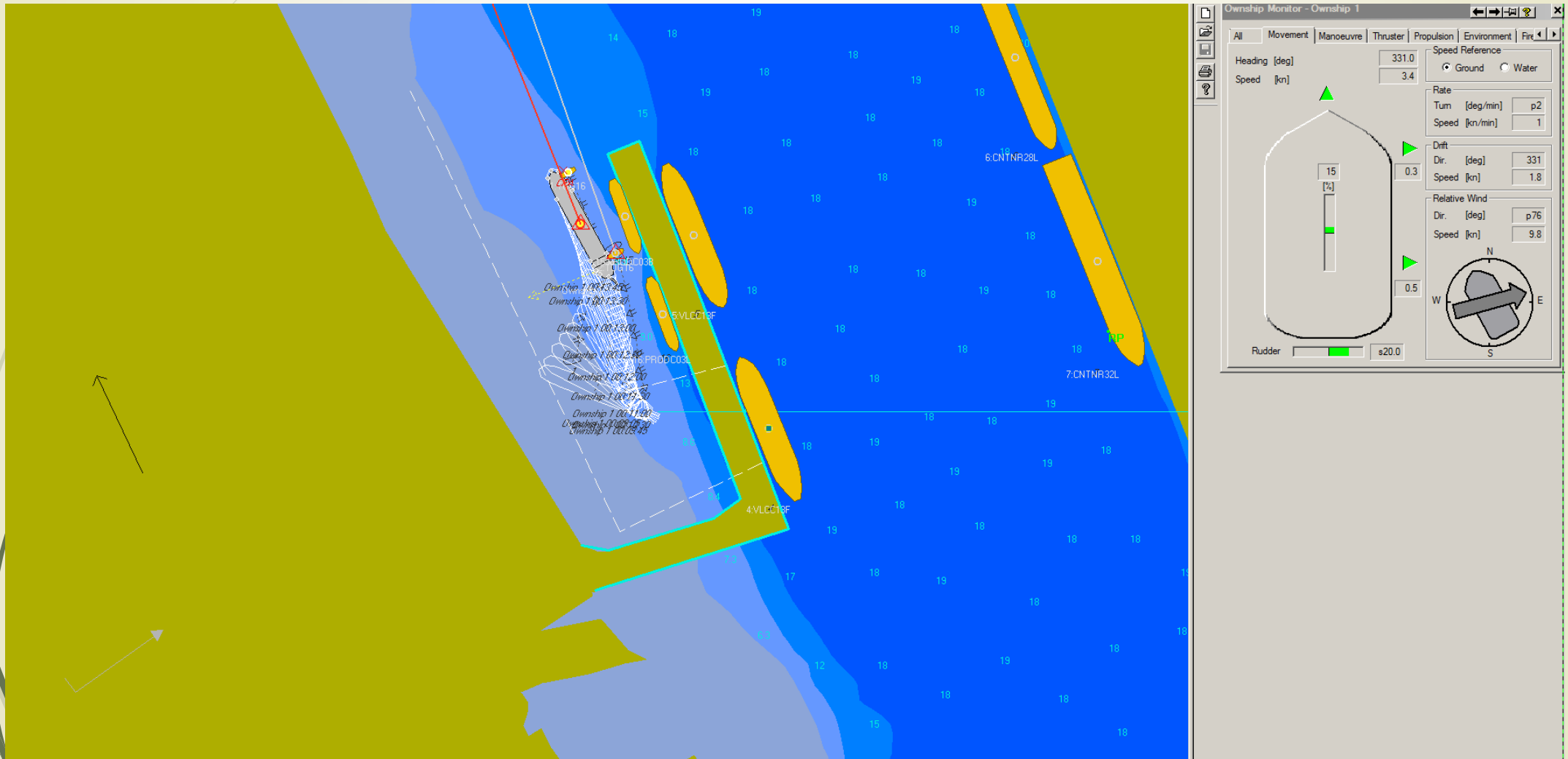
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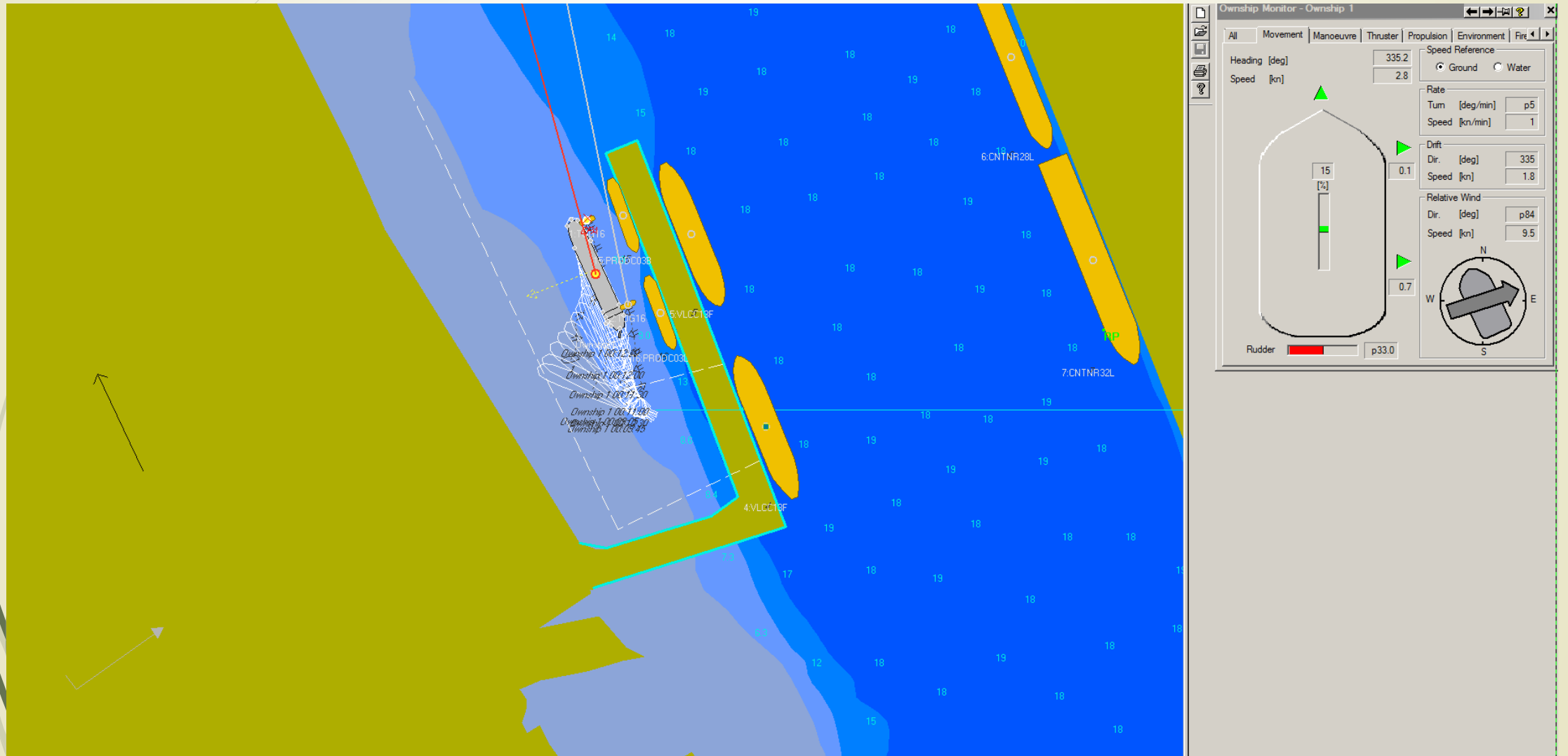
Ship handling simulation



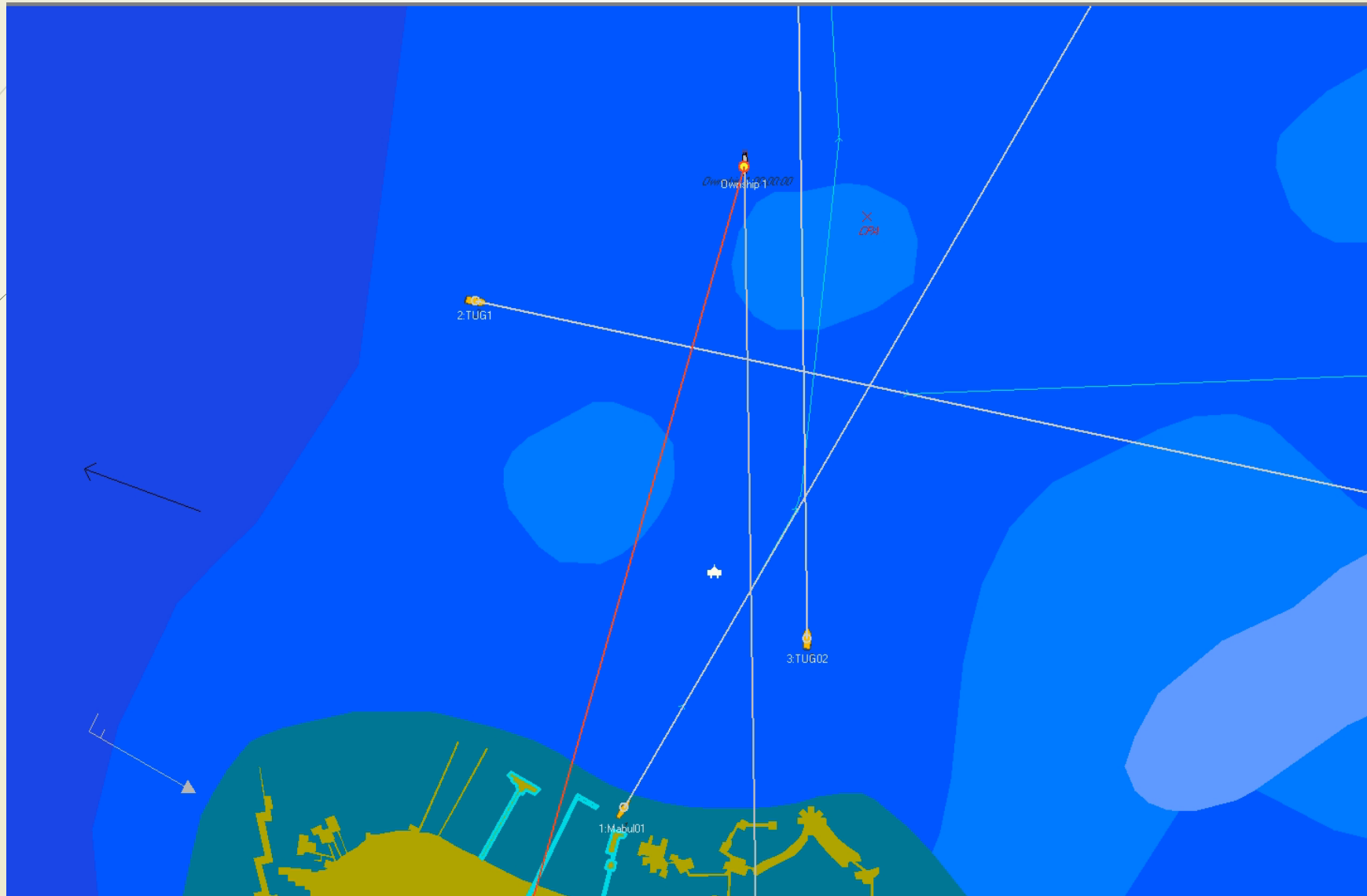
Simulation tracking



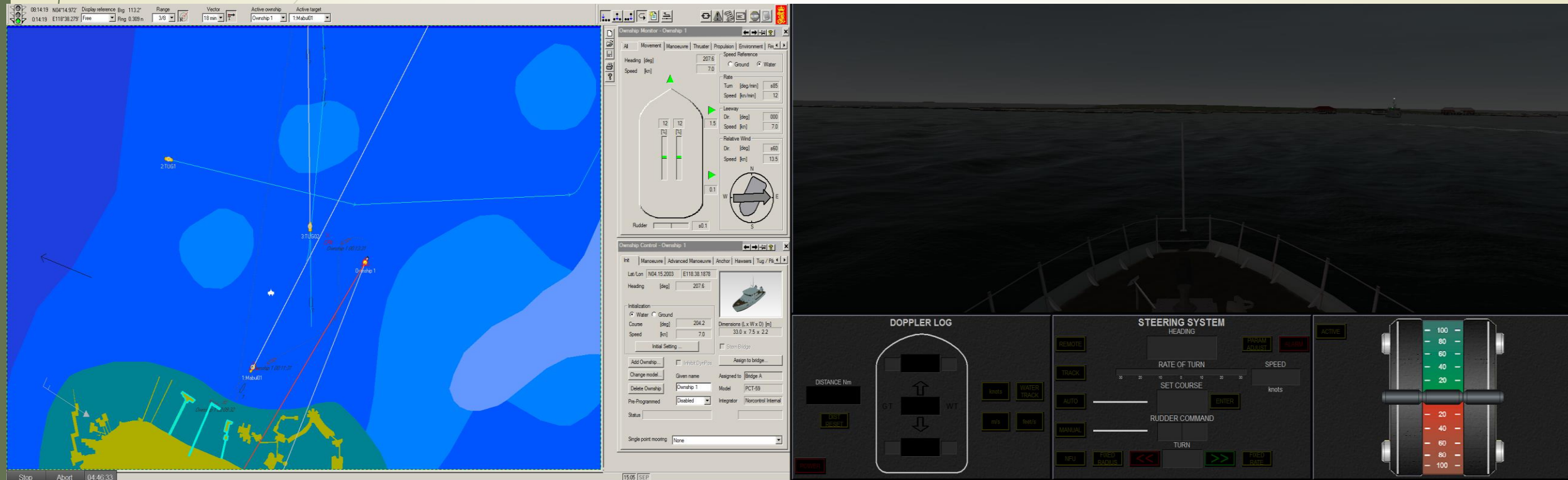
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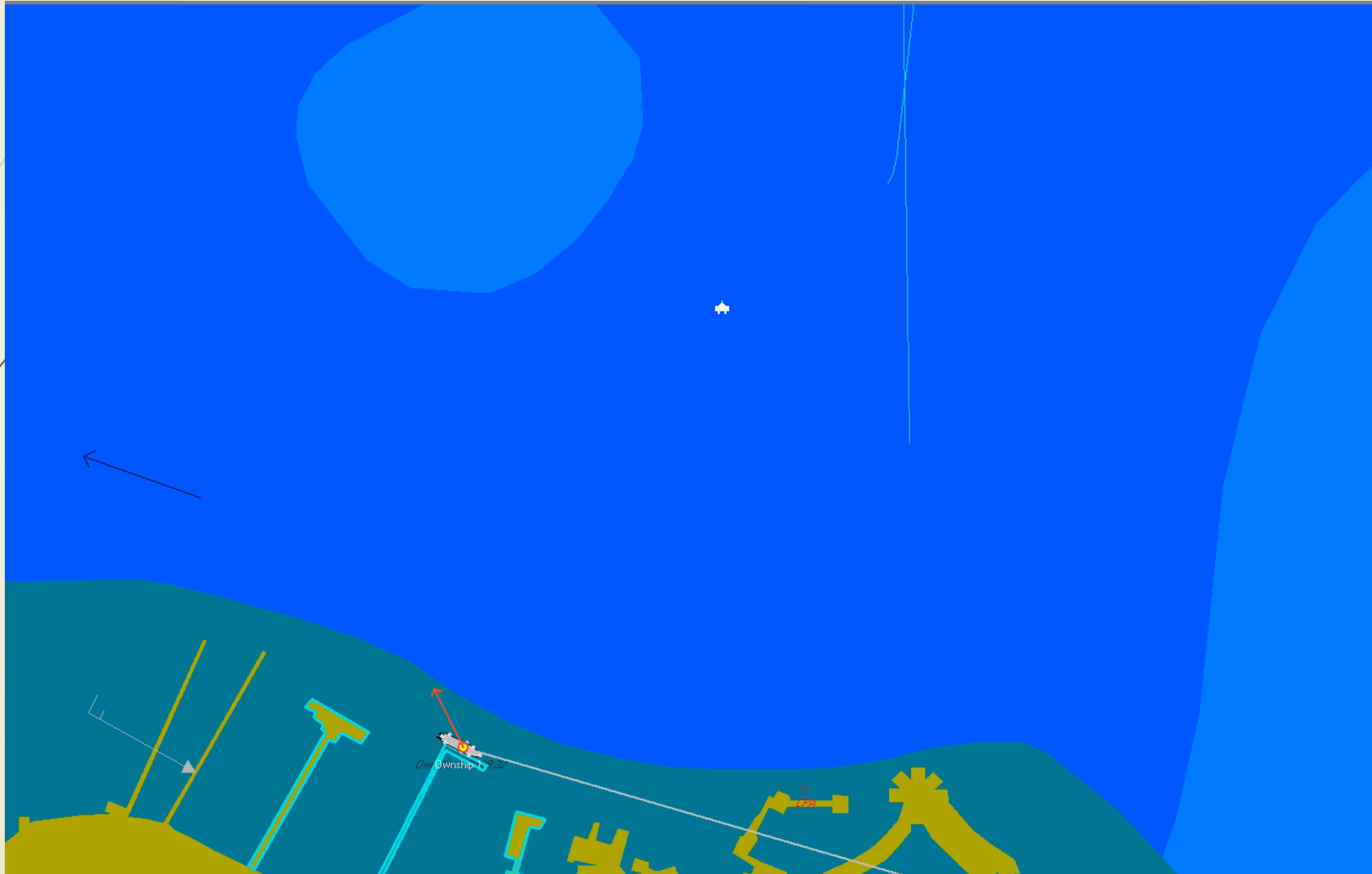
Mabul FOB SHS - Berthing



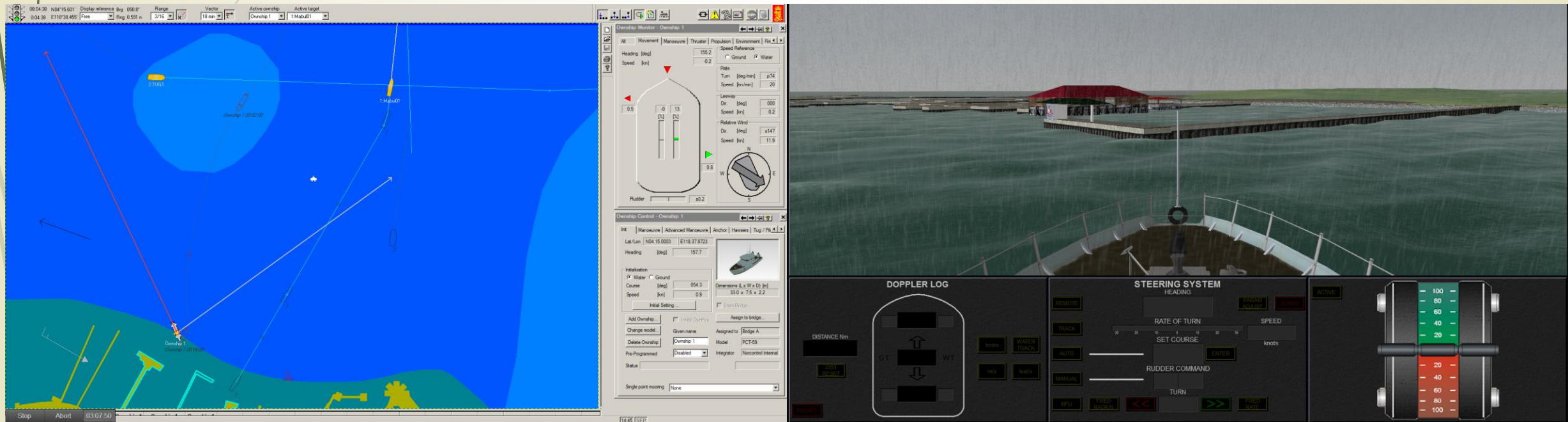
SHS visual – berthing @ night



Mabul FOB SHS - Unberthing



SHS Visual – berthing @ day





HAZID Workshop

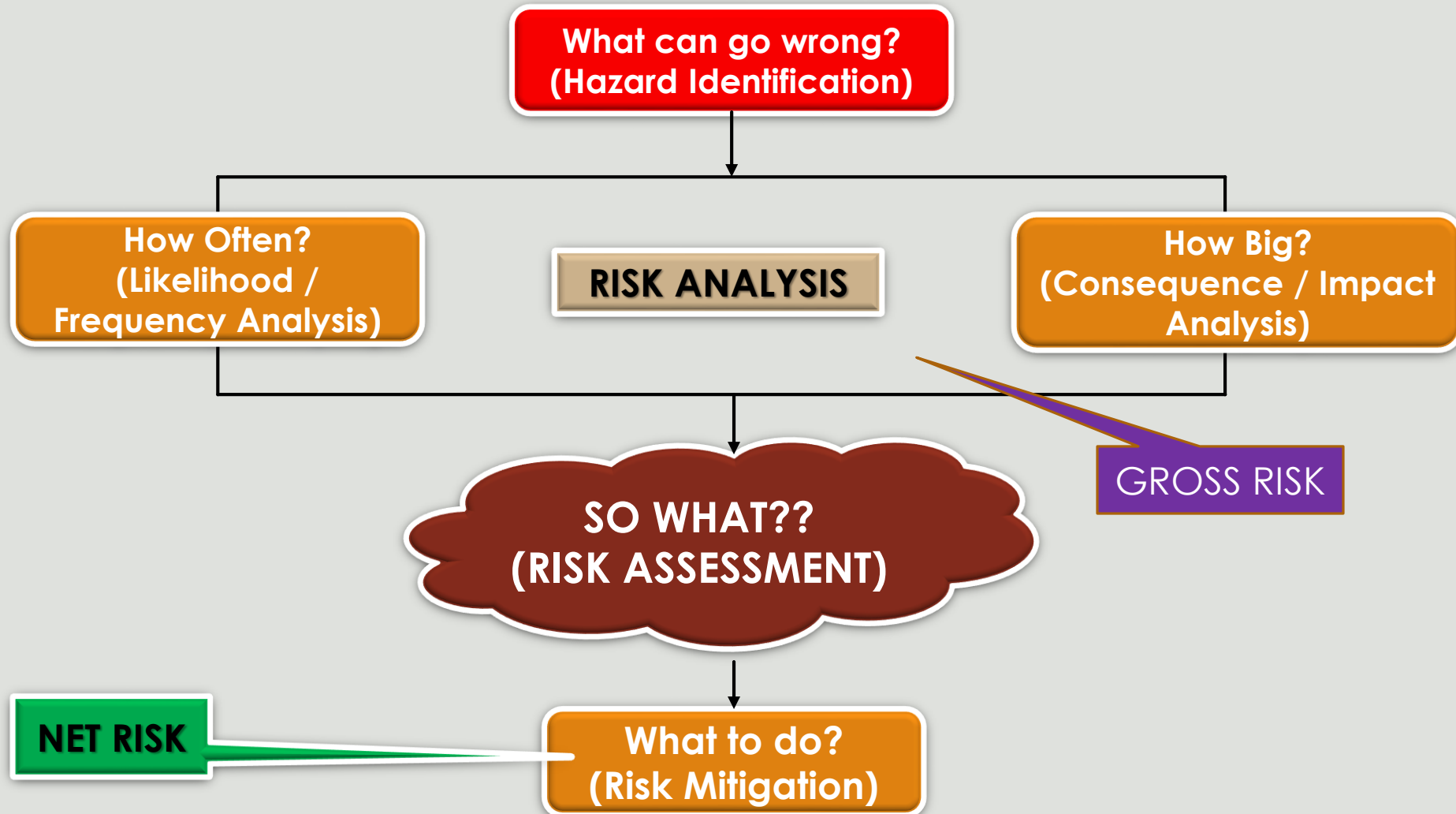
- The purpose of hazard identification is to **highlight the critical operations of tasks**, that is, those tasks posing significant risks to the health and safety of employees and the environment as well as highlighting those hazards pertaining to certain equipment due to energy sources, working conditions or activities performed.
- To determine the likelihood of occurrence and the severity of the consequence and the threat category of the risk.



Hazard grouping

- Hazards can be divided into three main groups;
 - i. health hazards
 - ii. safety hazards
 - iii. environmental hazards.

Risk Management Focus Chart

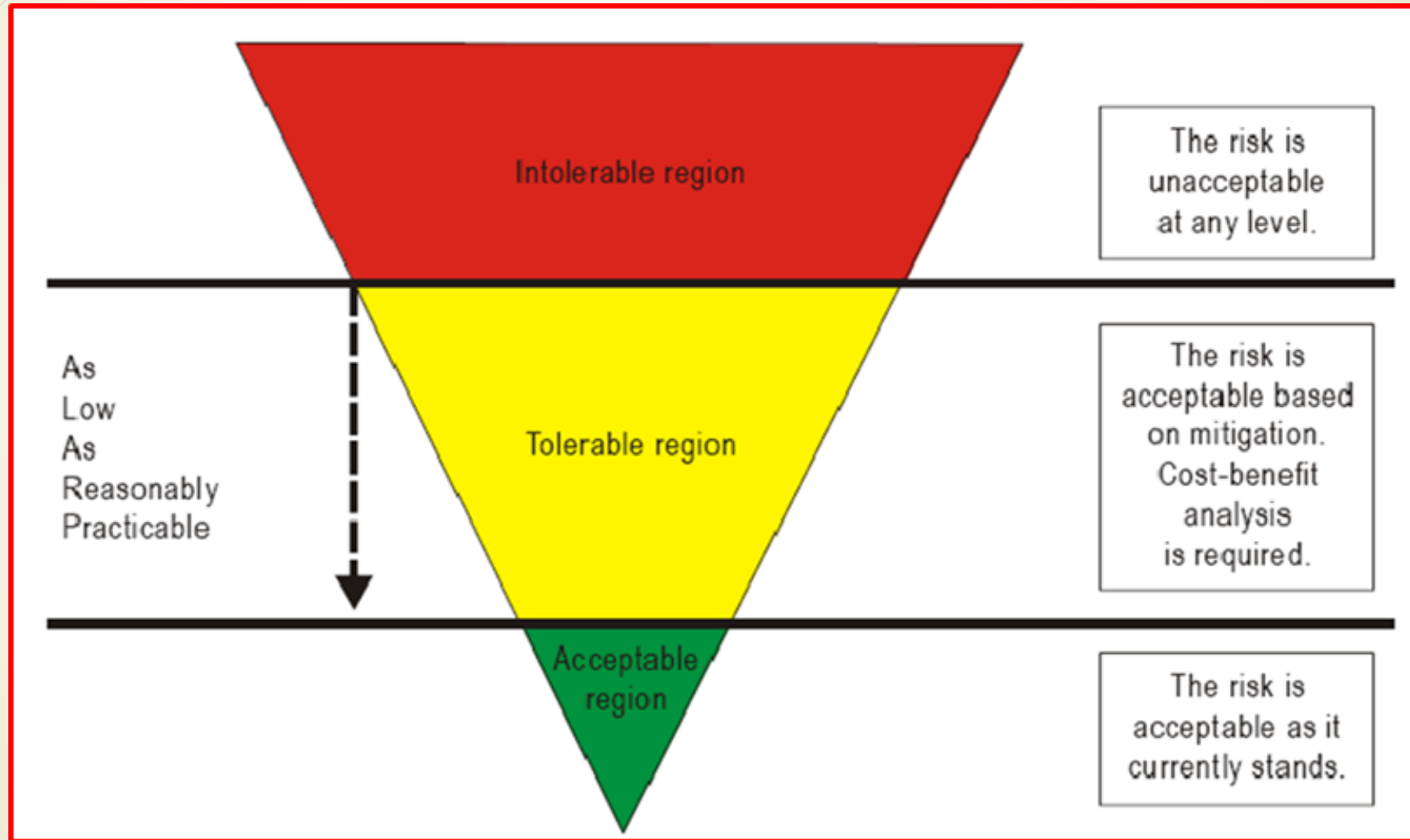




The HAZID Process

1. Identify the associated **Hazards events**
2. Identify types of **risks associated** to the hazards
3. **Likelihood (Frequency)** identification
4. **Consequences (Impact)** identification
5. Suggests **control options**
6. Selects **control measures**
7. Identify **NET Risk**
8. Develops **Risk Register**

ALARP Principles





Report writing

The report shall be as per Mardept MRA reporting format that include the following Chapters;

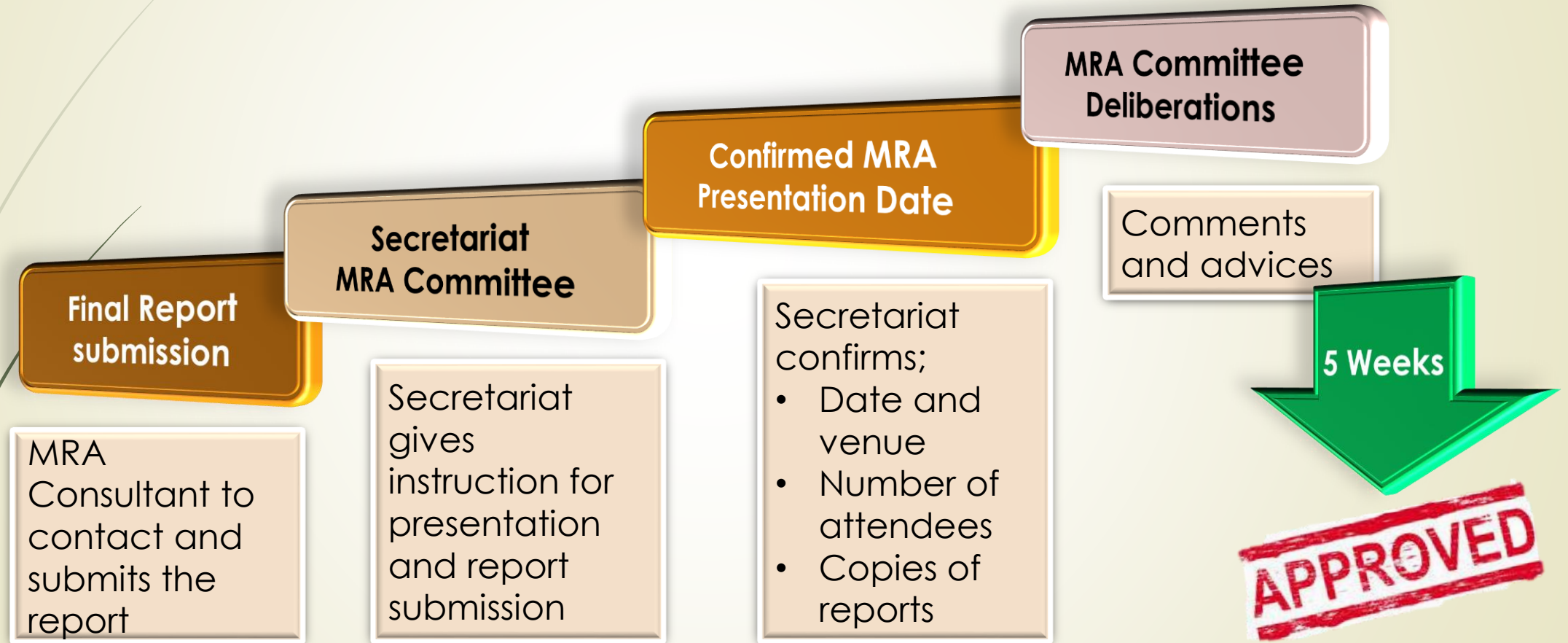
- **Part A:** Assessment Overview
- **Part B:** Safety Assessment
- **Part C:** Security Assessment
- **Part D:** Response Preparedness
- **Part E:** Recommendation and Conclusion



Report presentation

- The Project MRA Consultant is to present the final report presentation to the MRA Assessment Committee of the Mardept HQ (Peninsular) or the Sarawak Region Mardept (Sarawak) or the JPDS (Sabah) for approval.
- Leadtime for the result normally within 5 weeks thereof.

Approving process





Conclusion

- One size doesn't fit all.
- Stakeholders engagement must be carried out before the HAZID Workshop.
- SHS or FMSS must be carried out before HAZID Workshop.
- HAZID Workshop must involvement of all stakeholders.
- Control measures must be implemented and monitored.
- Additional controls in place to ensure effectiveness.

The End....





Terima Kasih Daun Keladi....