

# ~~Safe Mooring Operation~~

A functional approach to normal work

Nippin Anand PhD

Principal Specialist Safety Management DNV GL

# Disclaimer

The risk management of everything

The views expressed in this paper may not necessarily represent the views of the organisation



# An unfortunate departure

Just-in-time

# Last minute tasks

Lashings, cargo securing, ballasting, gangway

# Efficiency on bridge

Meeting deadline and KPIs

Single up, make fast tug

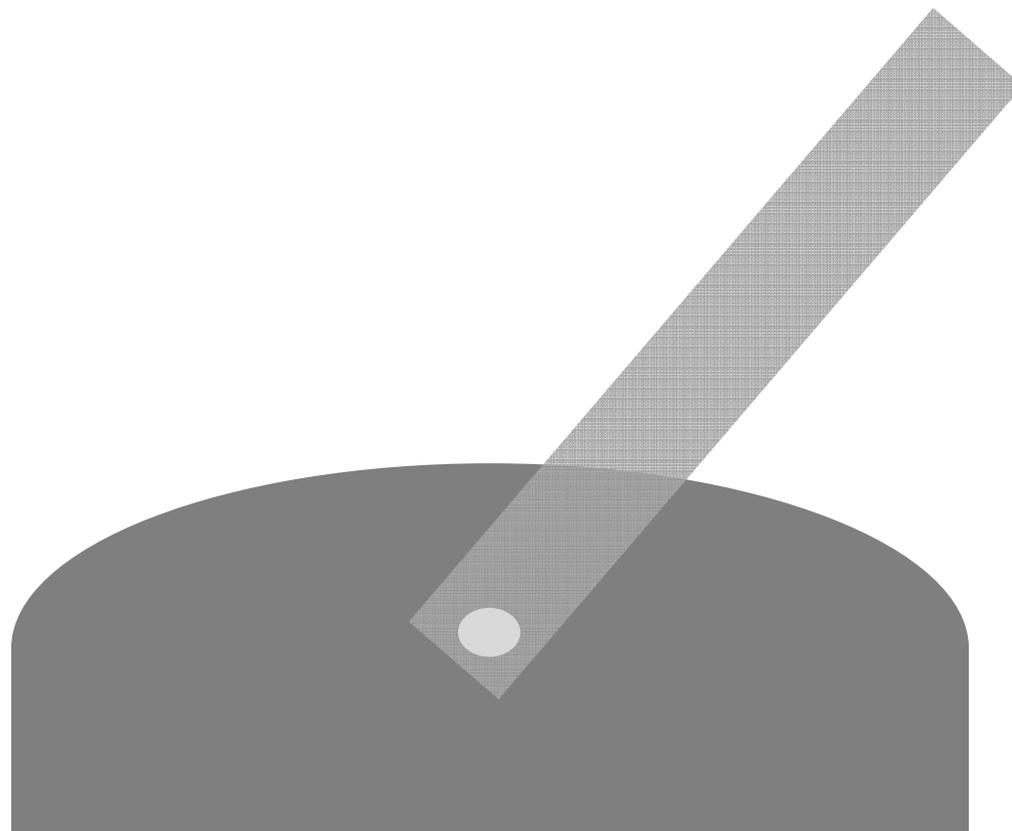


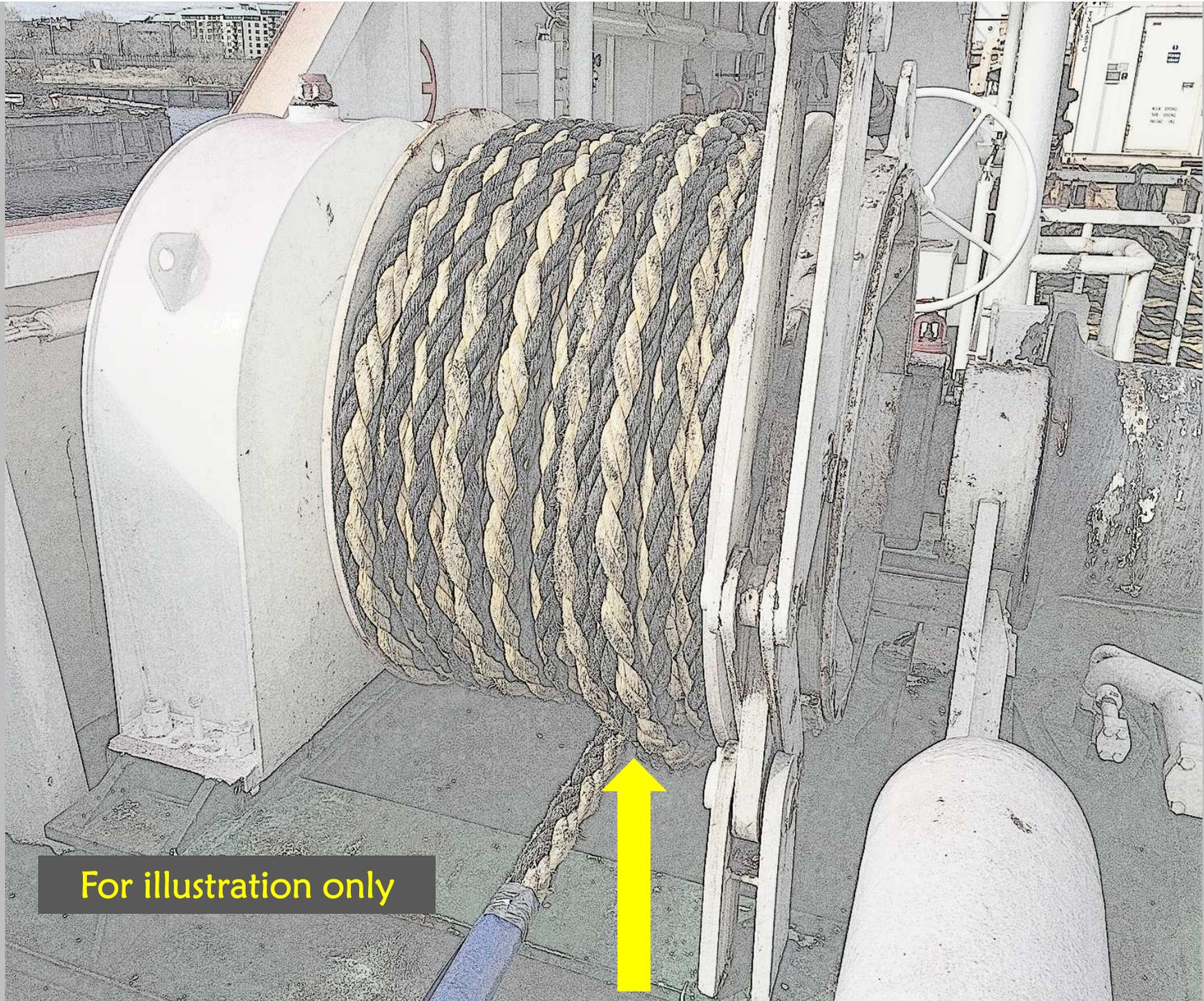
# Efficiency on deck

Jonard goes to single up, Max makes fast tug

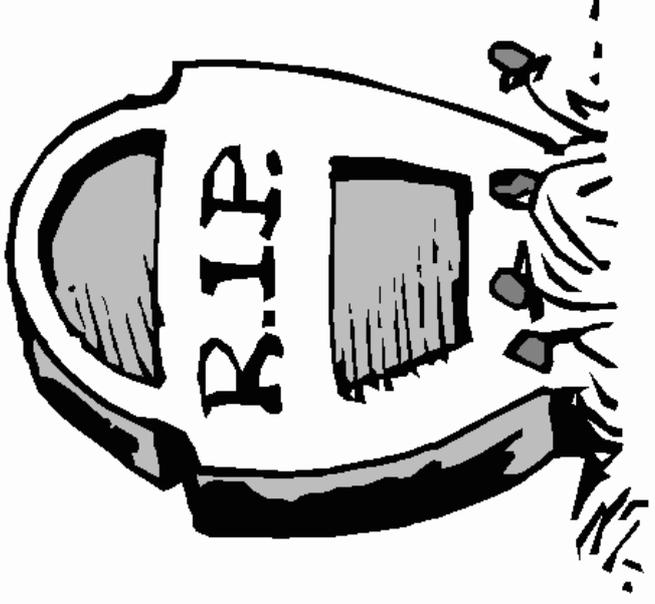
It has always worked  
and so it should!

**DO NOT LEAVE  
UNATTENDED!**

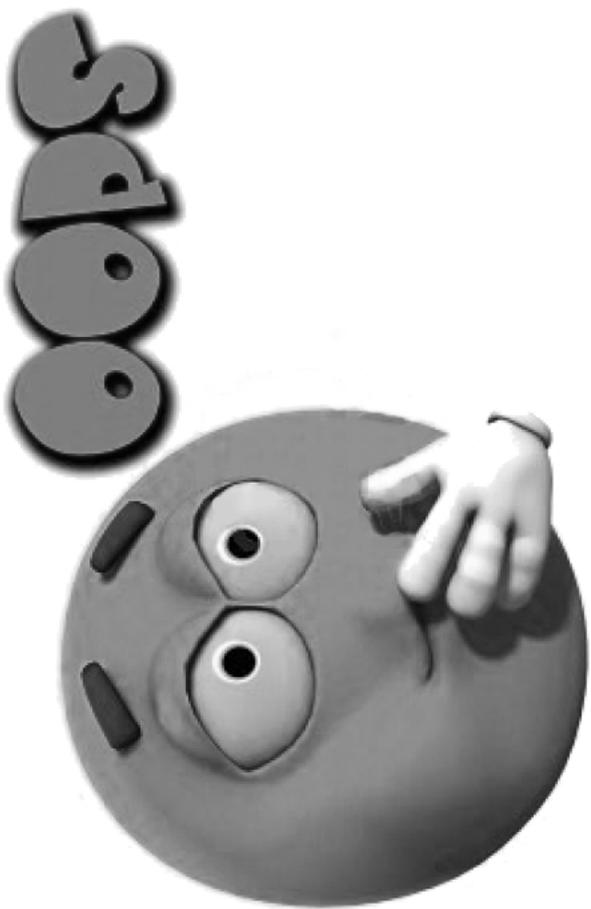




For illustration only







We can't fix the stupid

Fundamental attribution error

# Hazard, risk, unsafe

... or just normal people doing normal work

# Equivalence

“Knowledge and error flow from the same mental source, only success can tell one from another” Ernst Mach

What mostly goes right

... can sometimes go **wrong!**

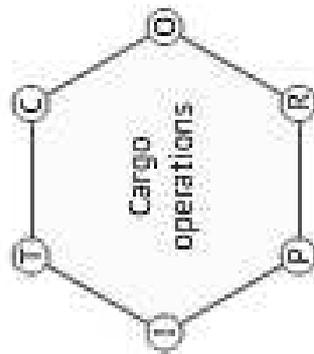
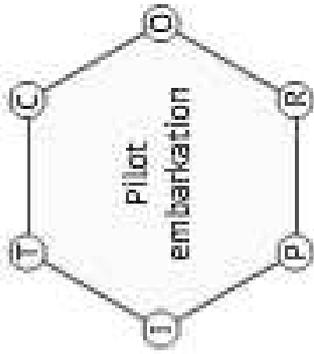
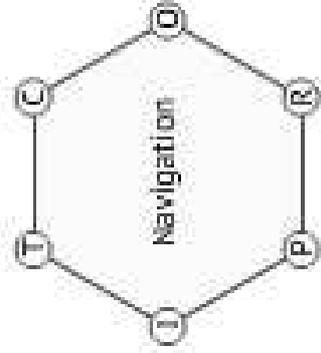
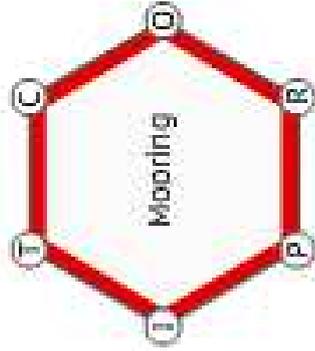
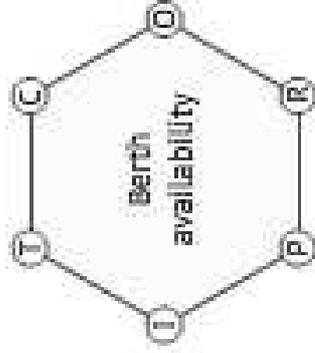
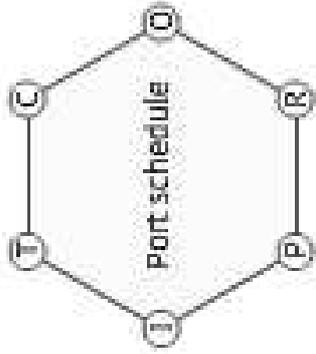
# The usual and the normal

Method and Language

Safe mooring  
... a functional  
operations  
approach to normal  
work

# Why functional?

Context, purpose and interdependencies



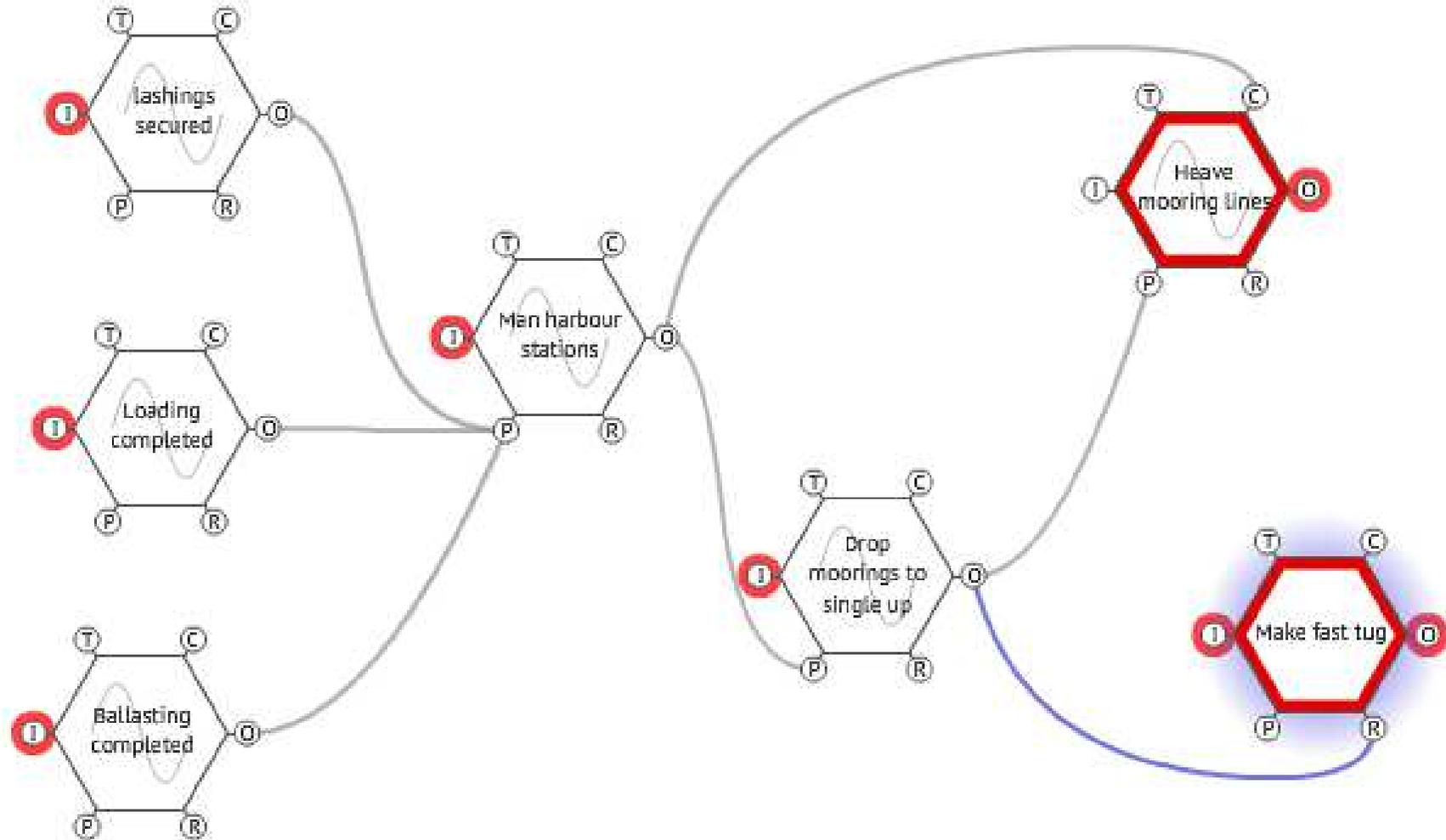
# Supply chain network

The wider purpose

# The method

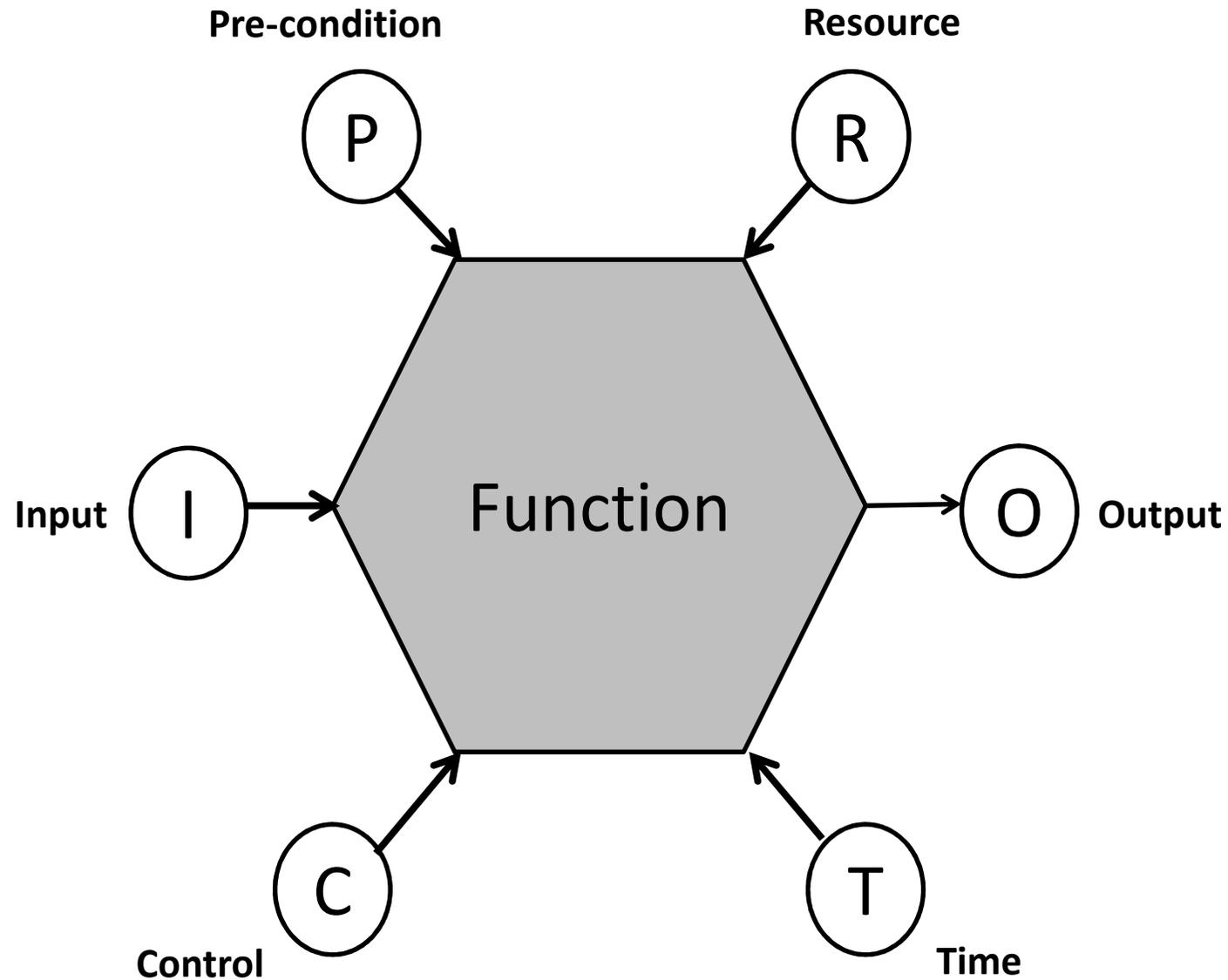
Functional resonance analysis

# The FRAM model



What is a function?

# A typical function



# Input

starts the function



# Resource

required for carrying out the function



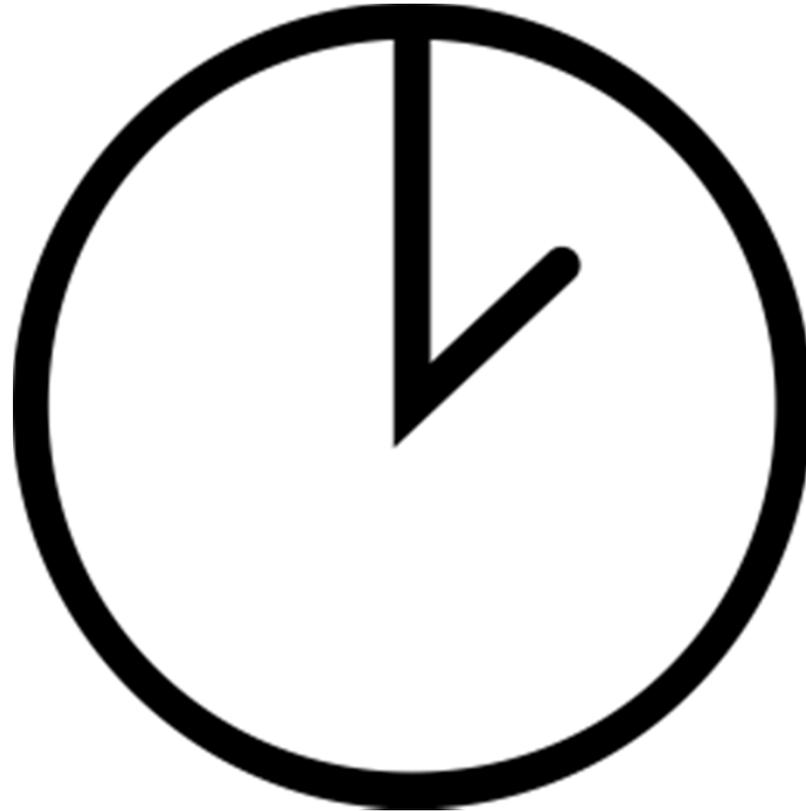
# Pre-condition

must be met before the start of the function



# Time

required for completing the function



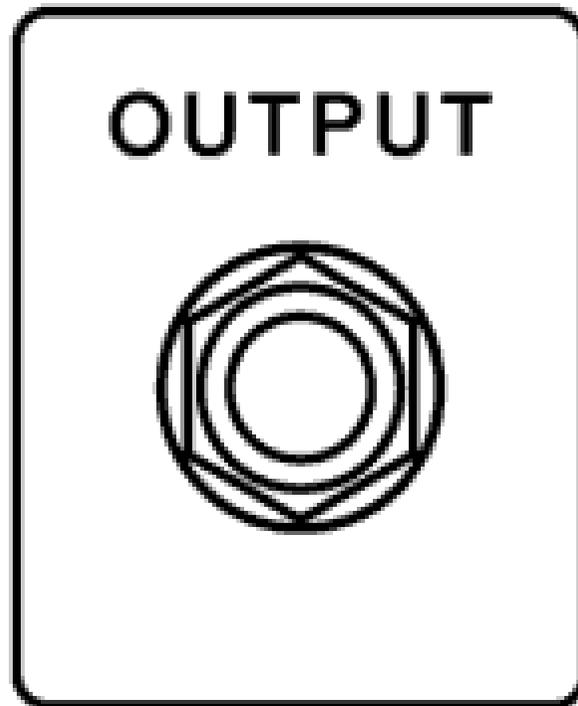
# Control

monitoring and intervening during the function

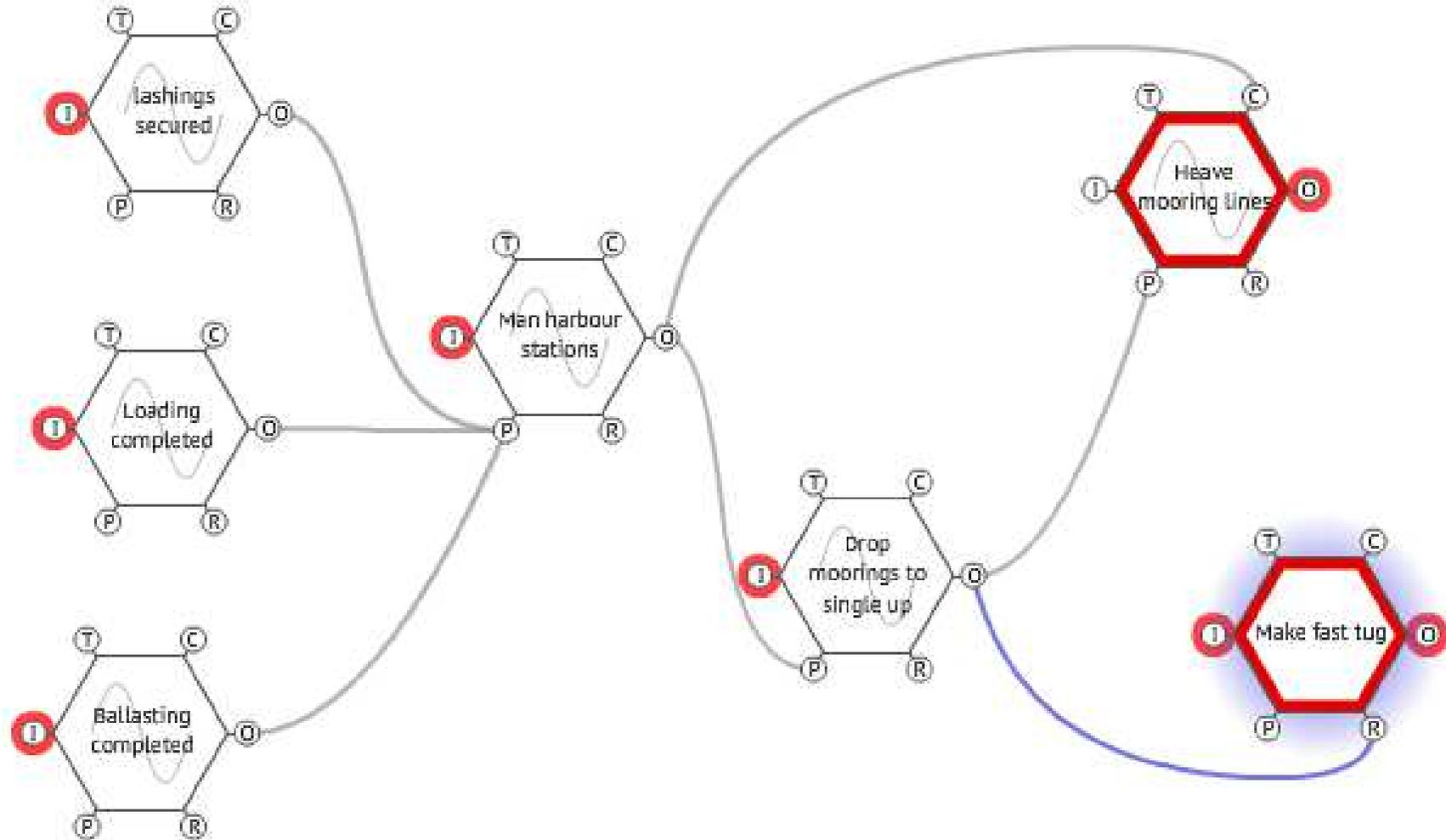


# Output

the end goal of the function



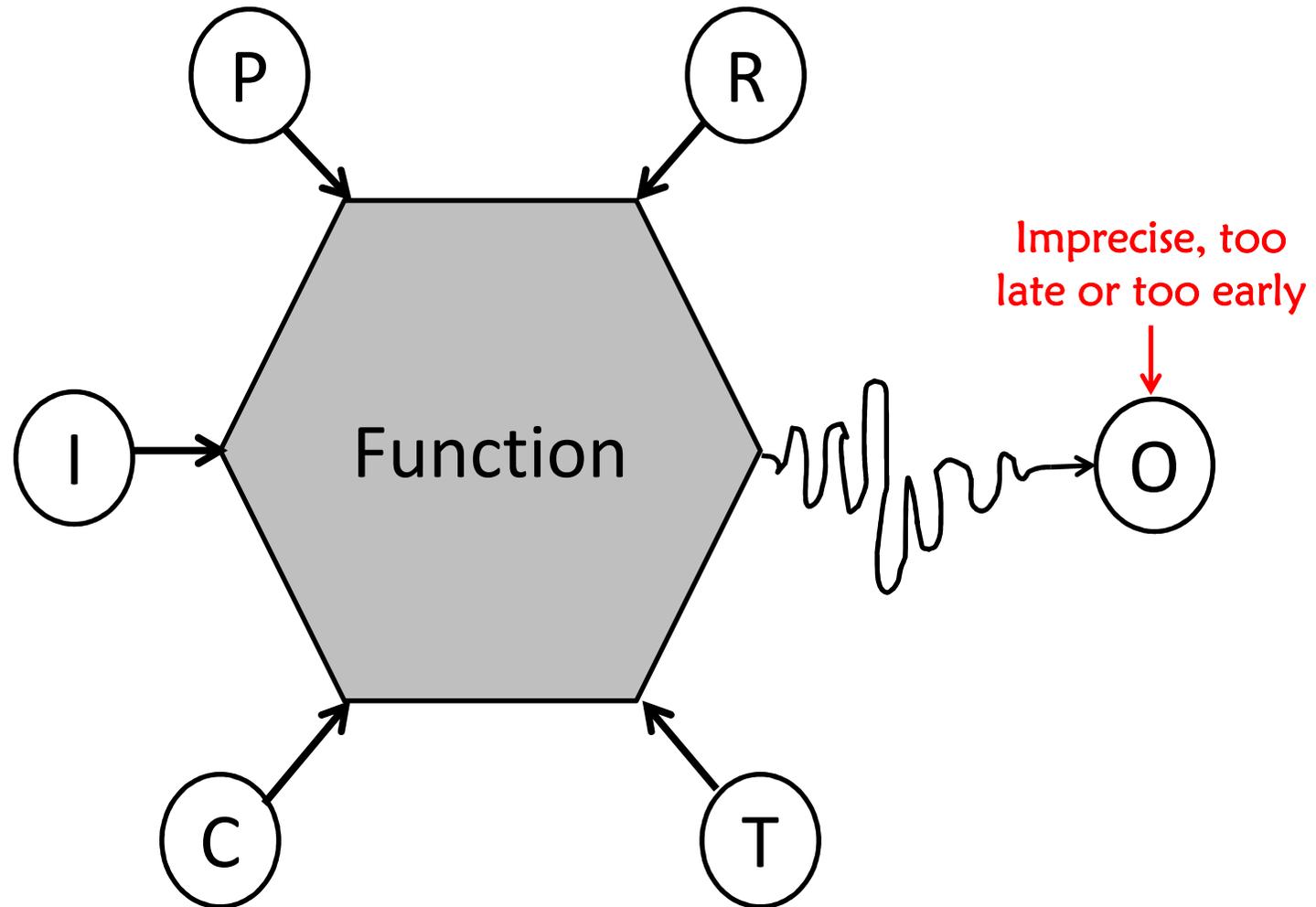
# The FRAM model



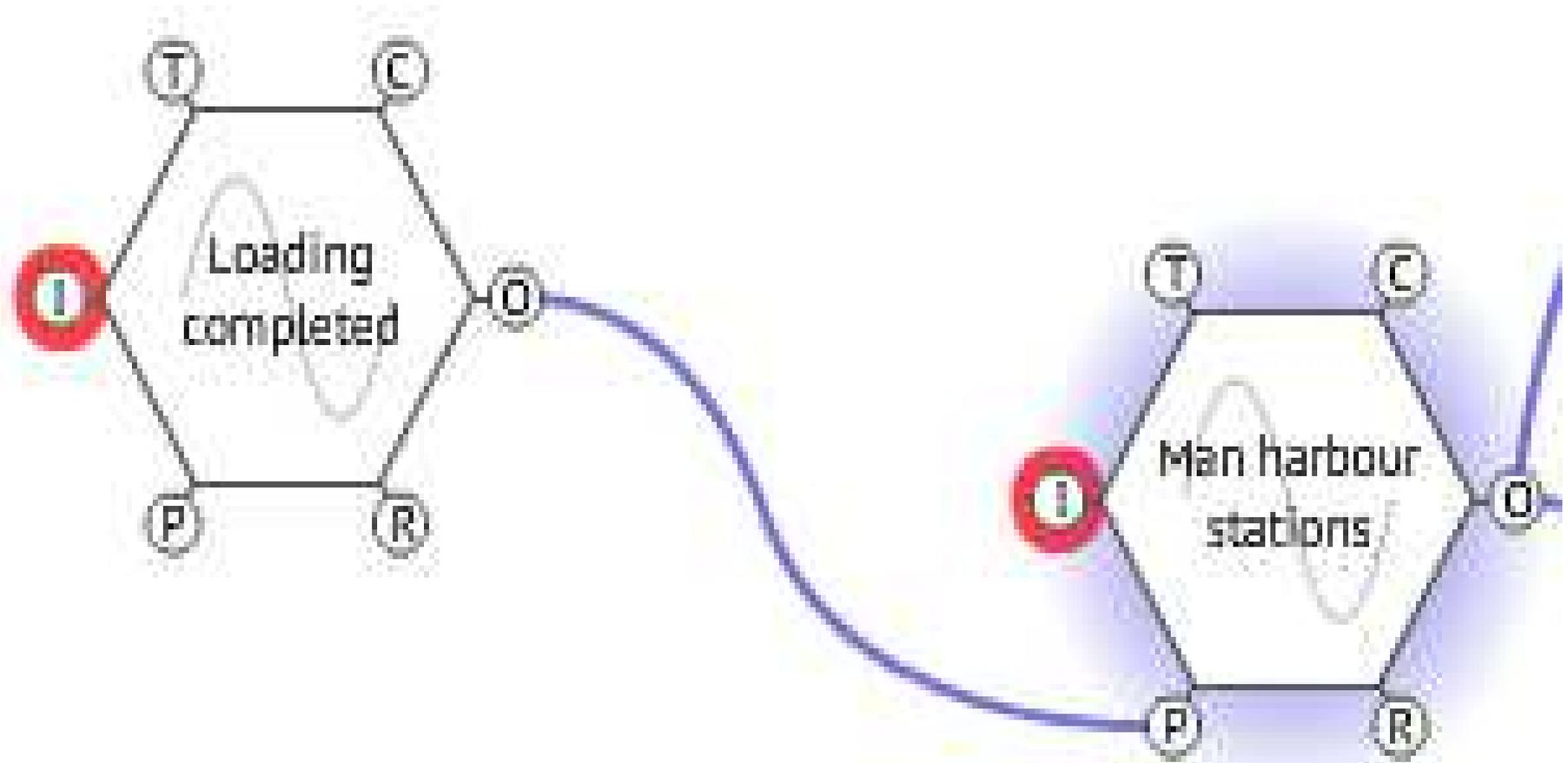
# What concerns us?

Output and interaction

# Output of function



# Functional interactions



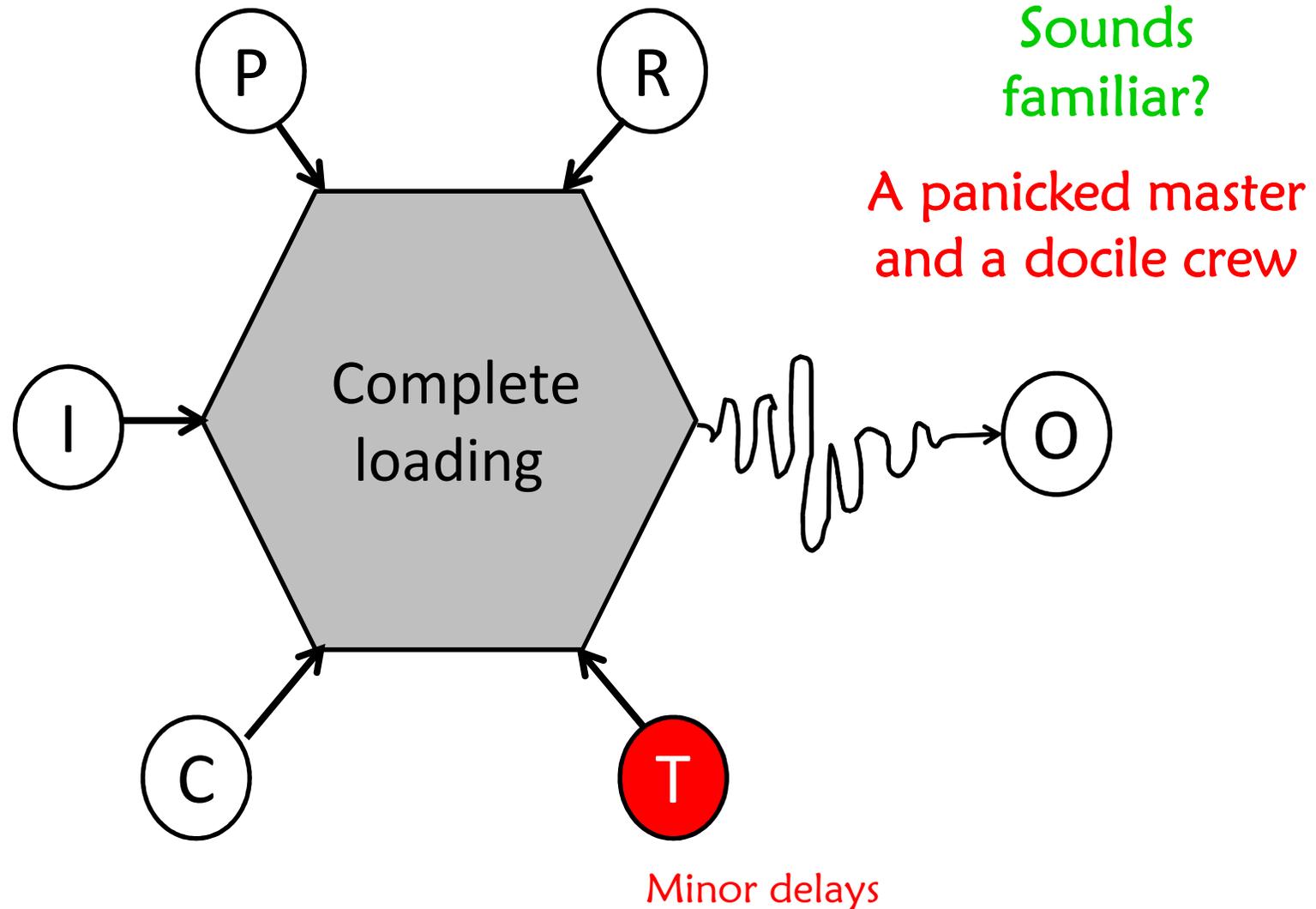
# Revisiting the case

Understanding what's going on

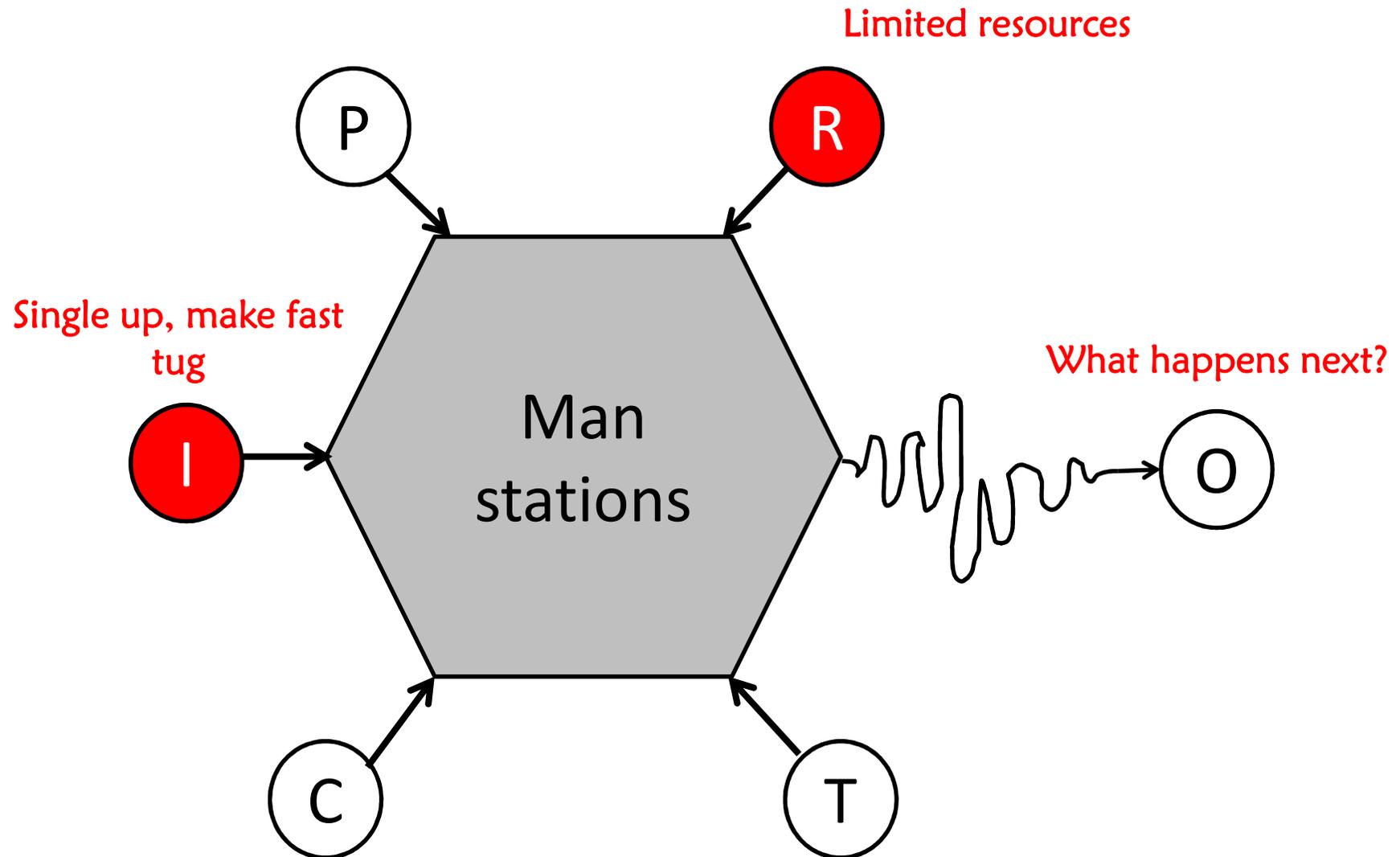
# Production pressures

influence blood pressure (and testosterone!)

# Production pressures



# Too many inputs



# Seamanship

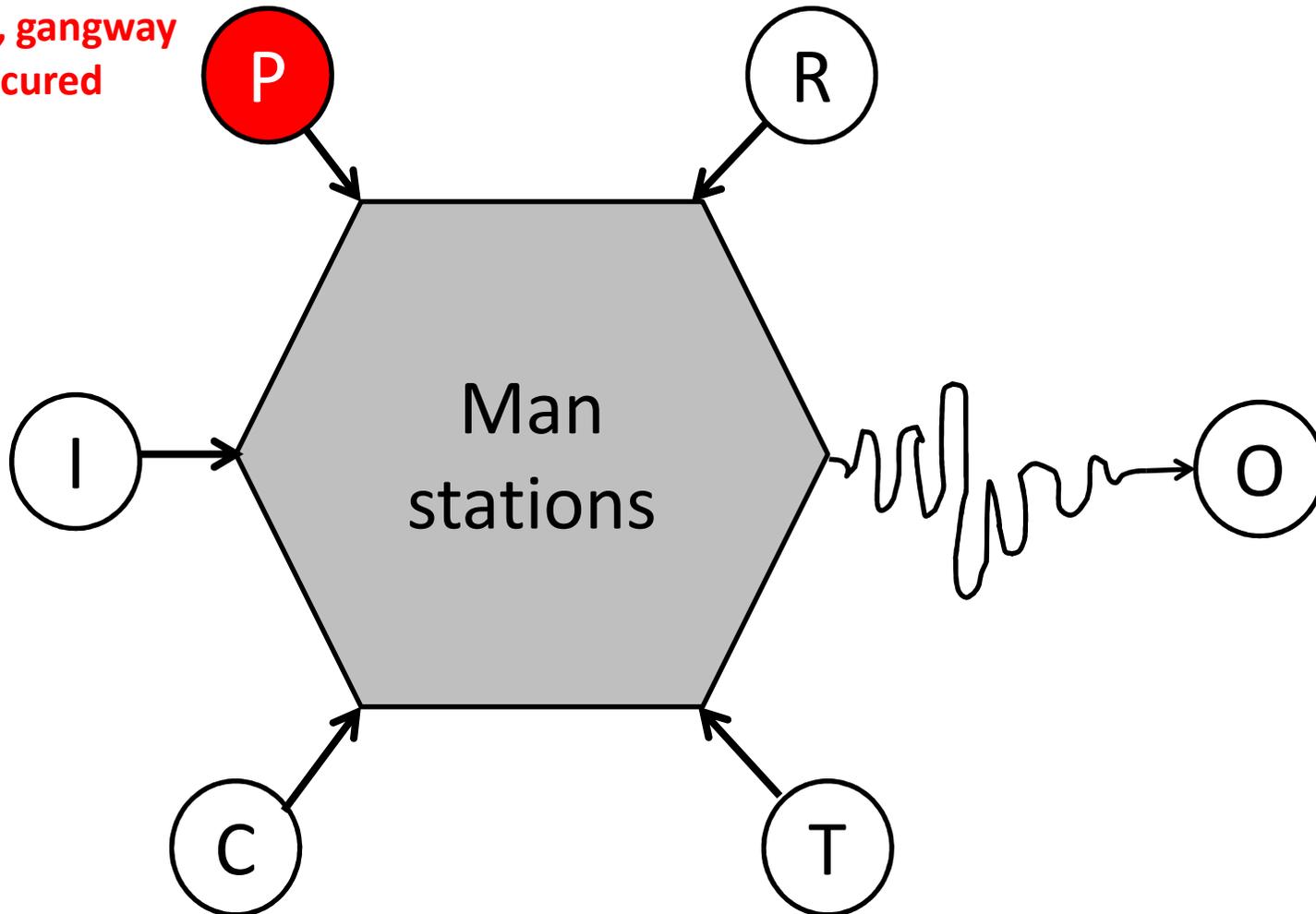




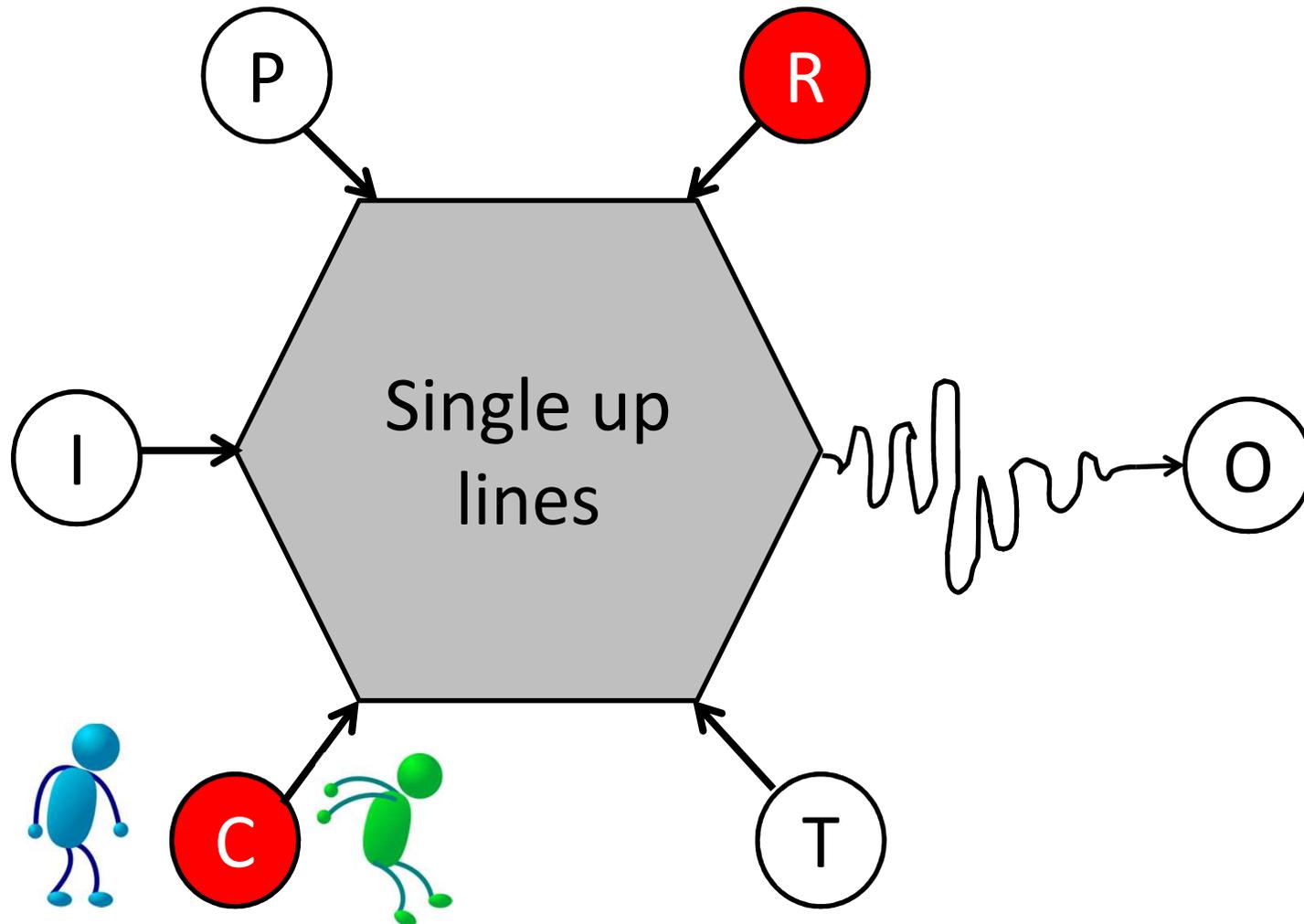
Source: UK P&I Club Mooring Incidents

# Pre-conditions not met

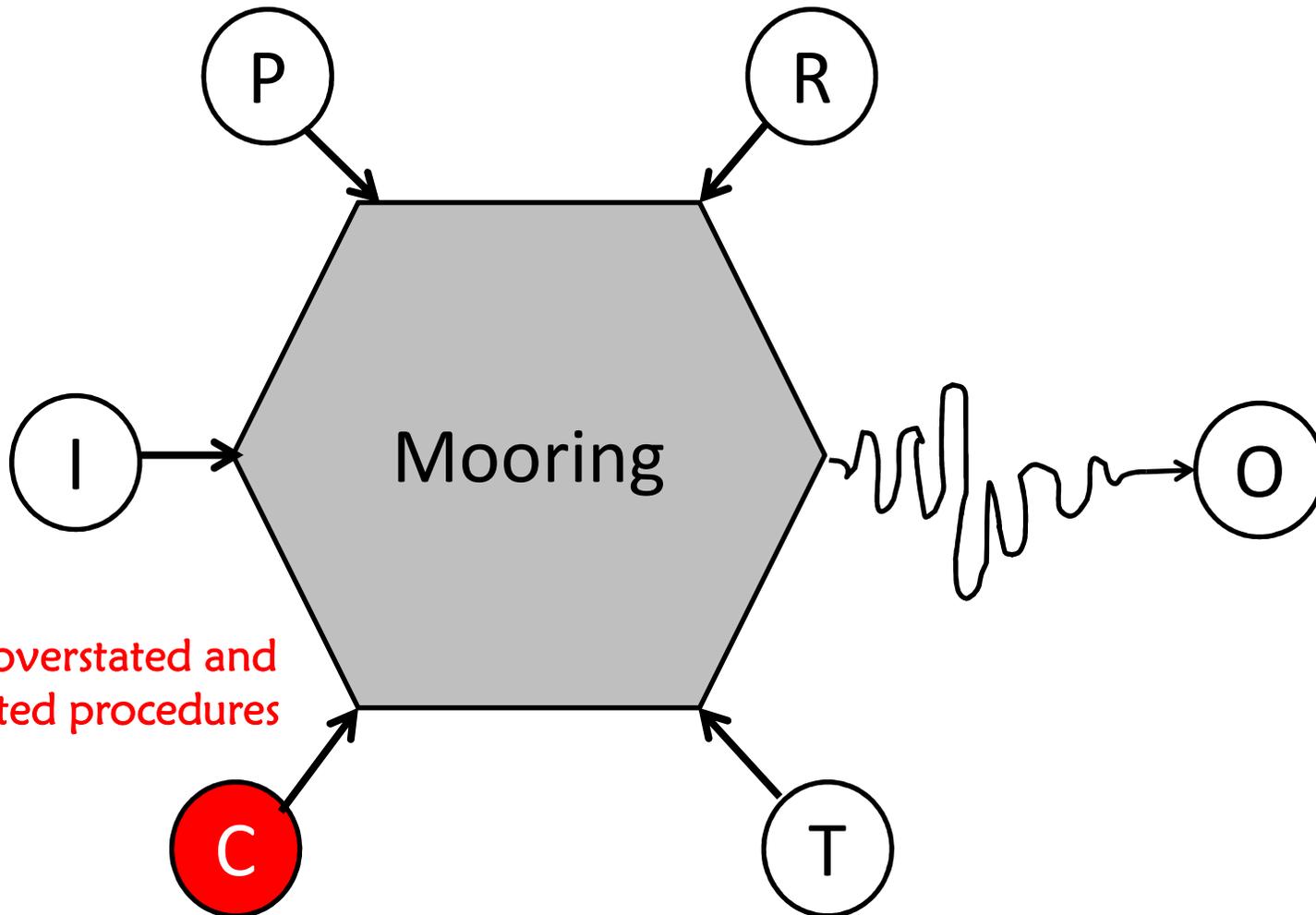
Lashings, cargo ops  
underway, gangway  
not secured



# Resource versus control



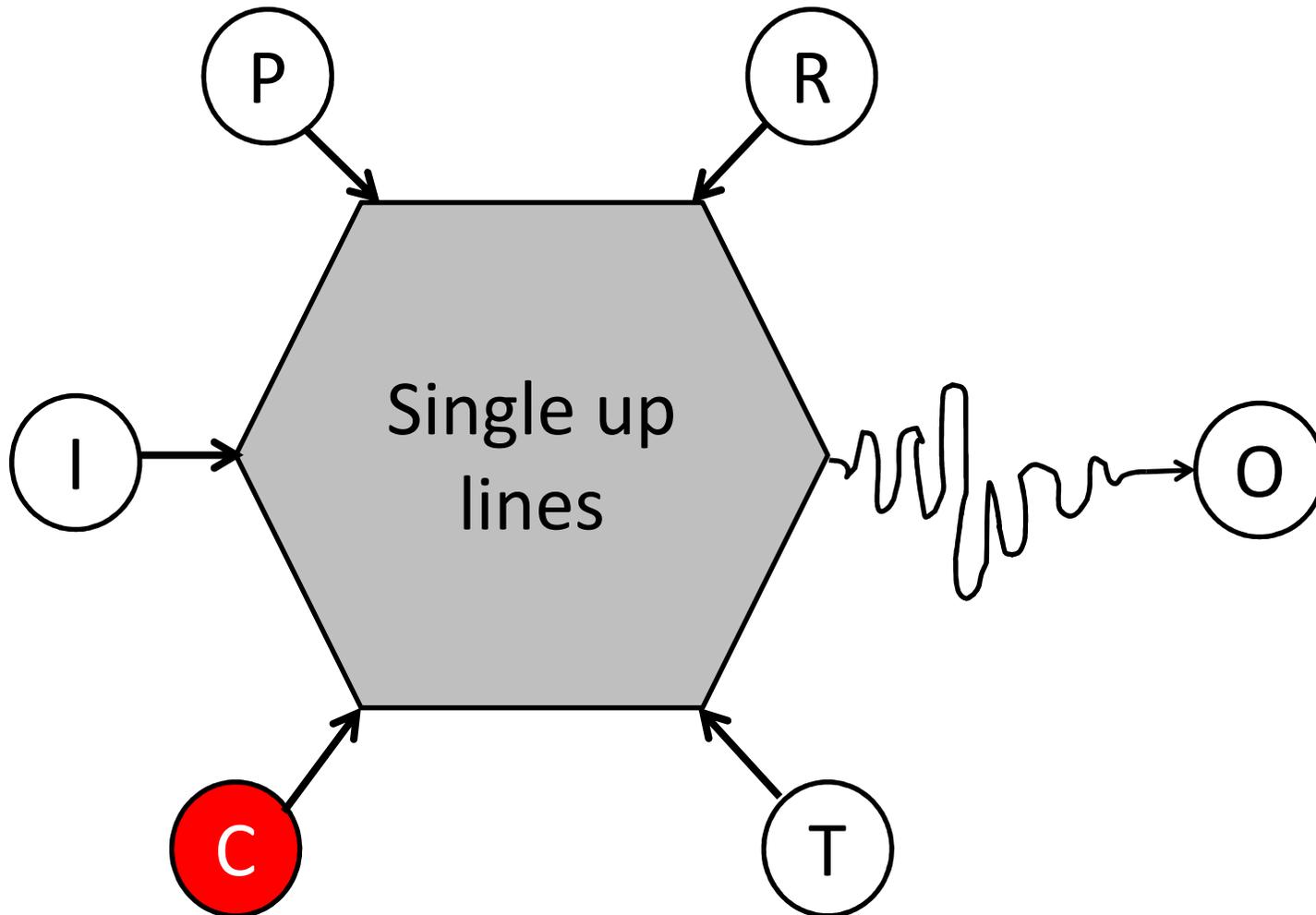
# Effective control?



# Rule violations

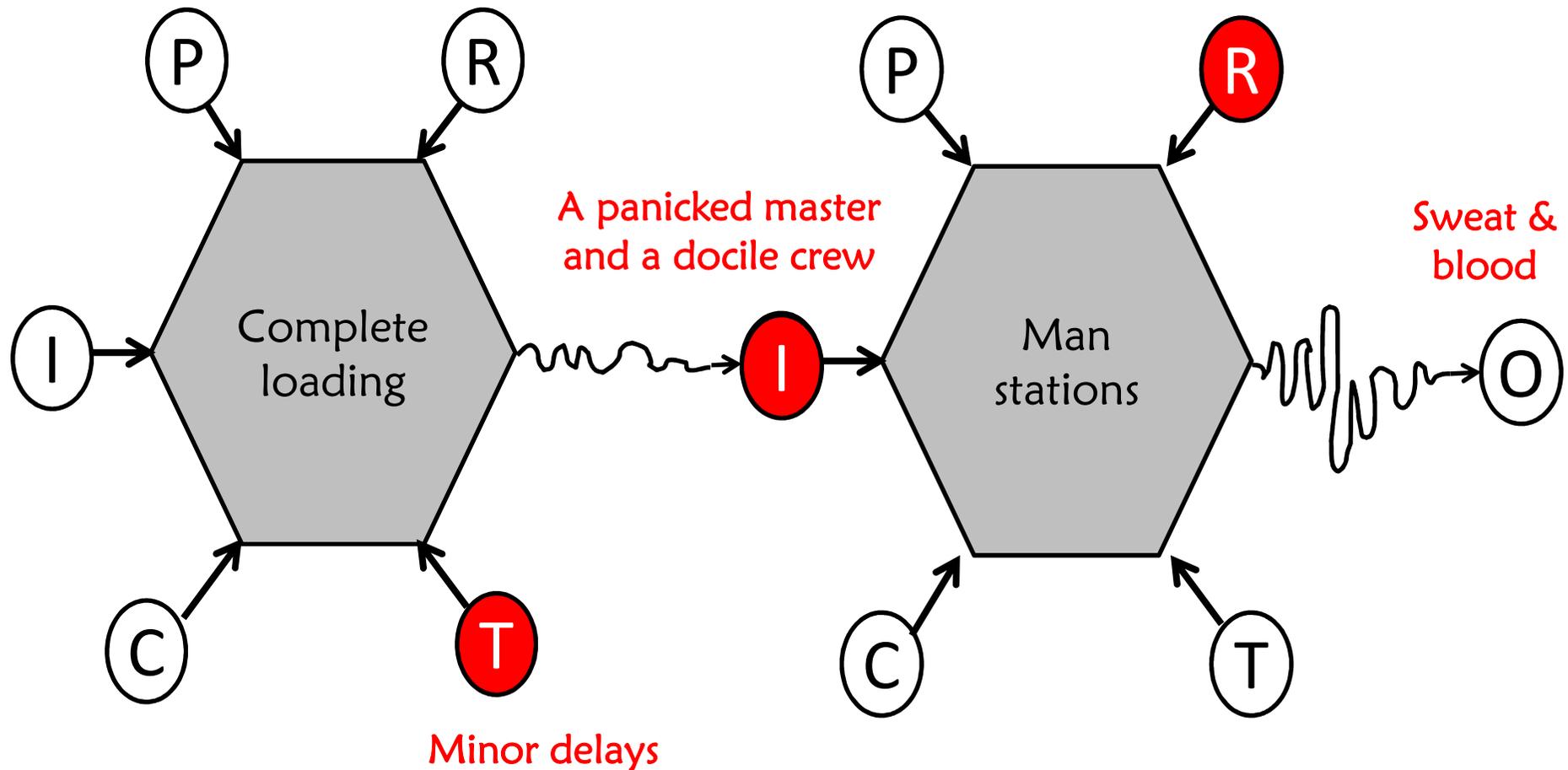
Really?

# Effective control?



# Functional interactions

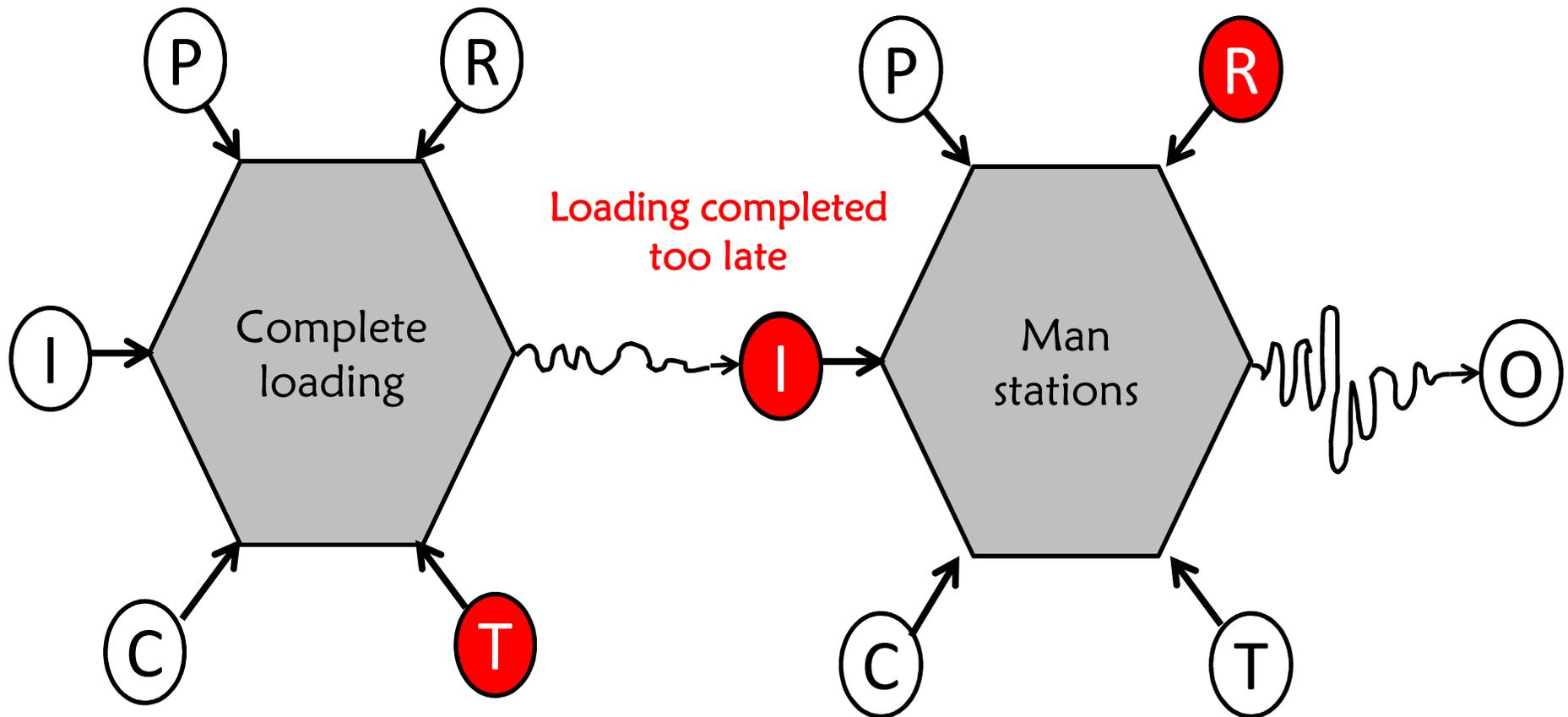
# Functional interactions



# Where is the root cause?

Non-linear, disproportionate outcomes

# Fuzzy boundaries



# Boundaries & Interfaces

Berthing, pilot, tugs, mooring operations?

# Recommendations

How things go right

Not why it goes wrong

# Mooring as operation?

Narrow view: snap-back, tensions, trip hazards

# Mooring as function

System: wider interdependencies and purpose

# Safety by design

Effective controls



# Communication styles

One input at a time

Single up & then make fast tug



# Functional interfaces

“Secure gangway before proceeding for stations”

Active intervention



**EMERGENCY STOP**

# Effective controls

Buddy watching, team pairing

# Effective controls

Clear line of sight

# A functional approach

Not isolated operation

Procedures?

Understand the normal  
not accidents and near misses, why?

# Because ...

When something goes wrong, it has usually gone well many, many times before. That is why people do it. So without understanding why it was done in this way and why it went well, we have no hope of understanding why it went wrong. (Anand 2016)

# FRAM

From accident investigation to risk management

Thank you