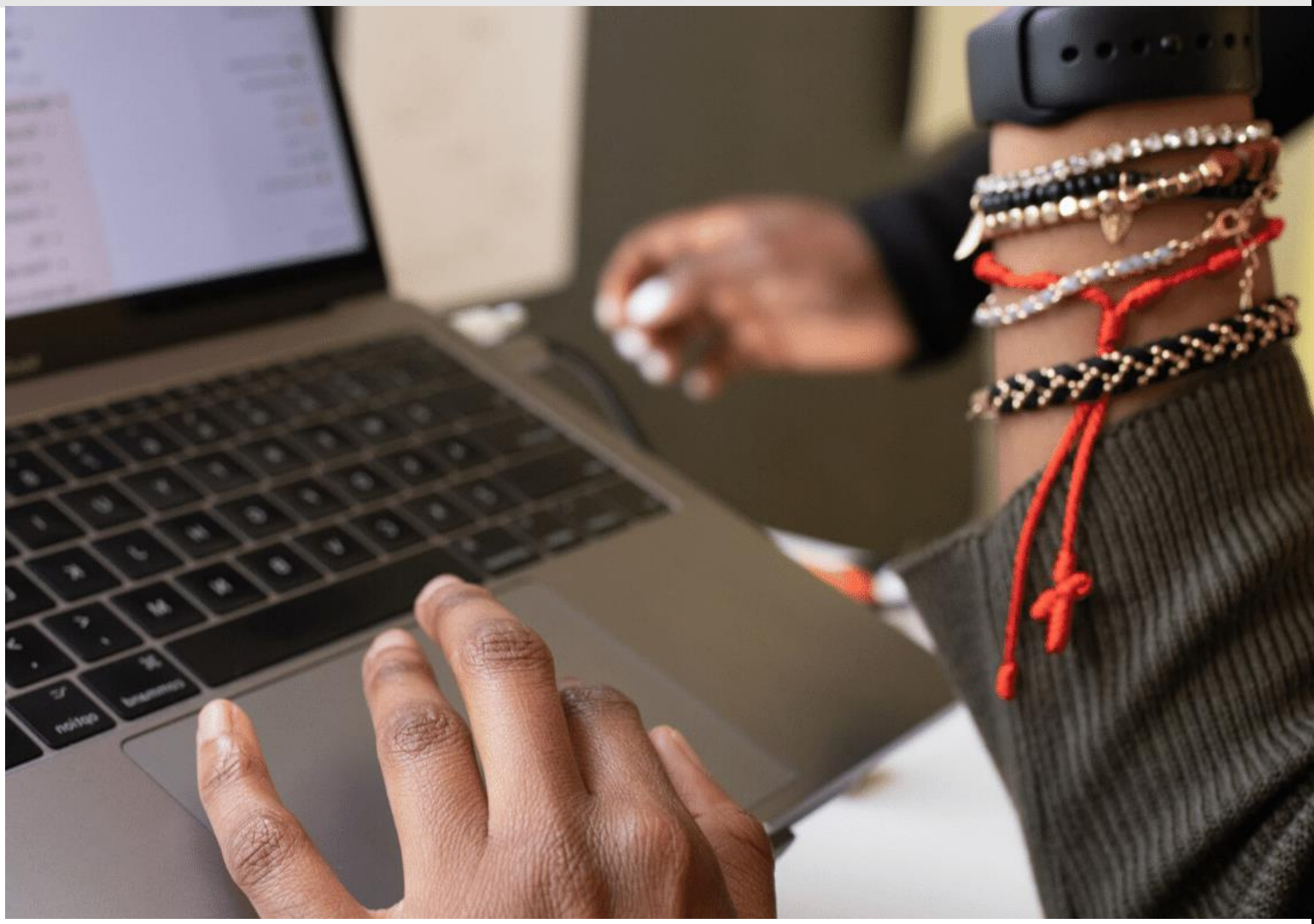
Module 01: Introduction

Maintenance Work Management

Rules of engagement in the VILT environment

1. Mute yourself when you are not speaking.
2. Close your email and any other distractions on your desktop and mute your phone notifications.
3. Let us know if you step away from the session, just type us a note in the chat.
4. Participate and be prepared to be called upon by name to give a response.
5. Speak up, use the chat, or raise your hand when you have a question or comment.
6. Use annotations when instructed to do so.



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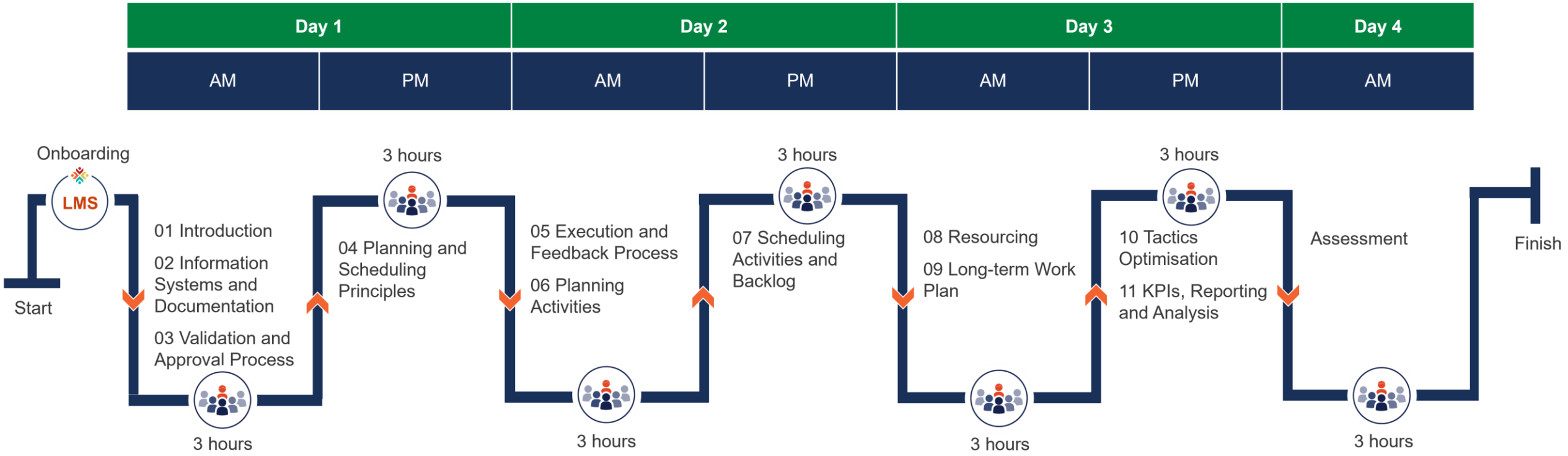
Illovo MWM learning journey



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Schedule for this session – Day 1

Time	Content to be covered
15 minutes	**Welcome**
30 minutes	**Module 01: Introduction to Maintenance Work Management**
10 minutes	**Leg stretch**
60 minutes	**Module 02: Maintenance Work Management: Information Systems and Documentation**
75 minutes	**Module 03: Validation and Approval Process**
	Lunch
180 minutes	**Module 04: Planning and Scheduling Process: Scheduling**

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Ice-breaker

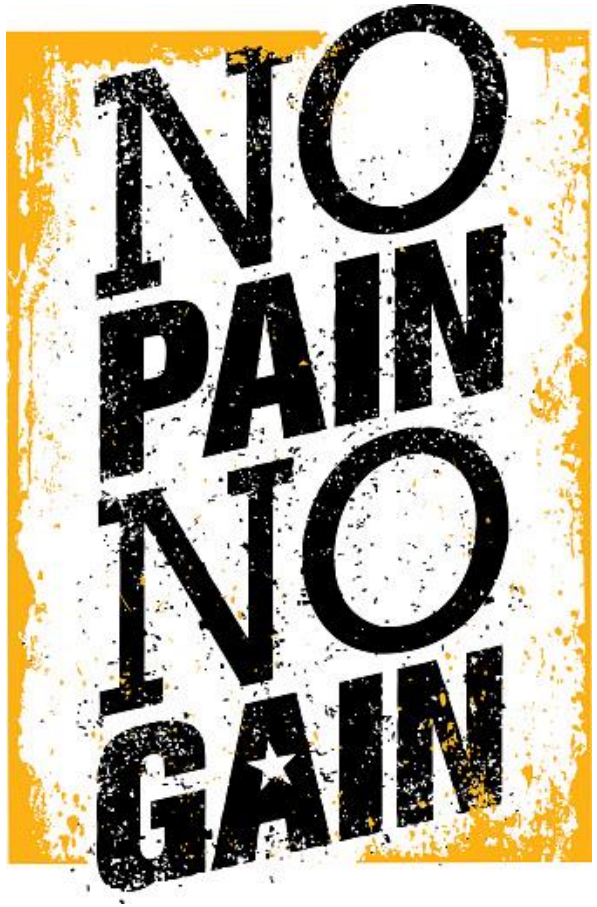
Use the public chat box and type in your answer to the following question:

What are you expecting to learn in this course over the next ten sessions where we are specifically looking at maintenance work management?

Learning outcomes of this course

- Explain how different software applications and document controls can meet the requirements of maintenance work management.
- Identify and prioritise work arising through notifications or work requests.
- Describe the benefits and explain the different roles and responsibilities when following a controlled maintenance work management process.
- Scope and plan the work arising based on the notification or work requests.
- Apply effective planning techniques for tactical and non-tactical maintenance in the workplace.
- Apply effective scheduling techniques for tactical and non-tactical maintenance.
- Monitor execution activities and review work order feedback for optimisation purposes.
- Interpret production plans, resource requirements and opportunities for tactical maintenance.
- Discuss and implement solutions for recurring repair and maintenance problems and the optimisation of basic maintenance strategies.
- Analyse and interpret maintenance work management reports for management and control purposes.

Check yourself



Now that you have seen the learning outcomes, what do you think would be the biggest benefit that you will gain from completing this course on maintenance work management?

Learning objectives for this module

After completing this module you will be able to:

- distinguish between the different drivers to make maintenance decisions
- explain the goals and benefits of a disciplined maintenance work management cycle
- explain the importance of time optimisation
- identify skills needed to be successful in the modern day workplace as a planner or scheduler
- explain how work management fits into the Maintenance Model.

Business needs

Across all operations, businesses are chasing:

- quality
- speed
- efficiency
- costs.

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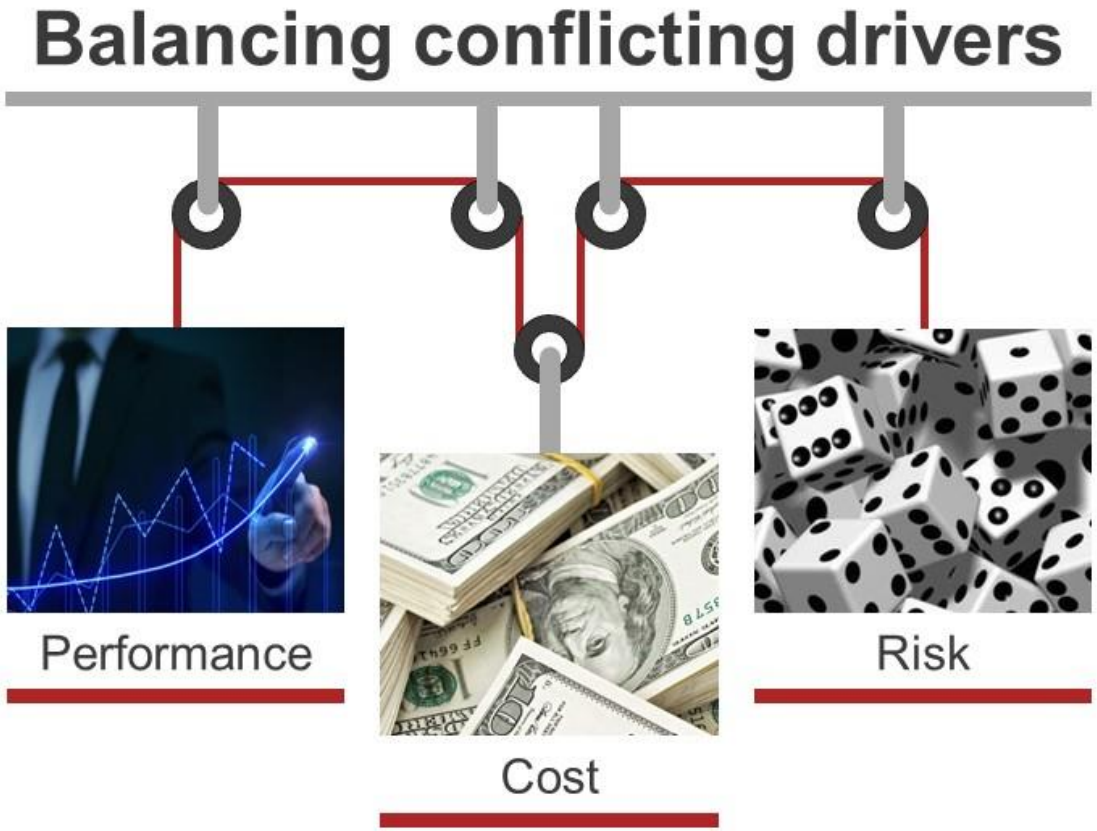
To do or not to do



In the world of maintenance, the three big influencing factors when decisions are made are:

- Will it impact performance?
- What is the impact on cost?
- What is the size of the risk?

Maintenance work management improvement

If you apply an efficient MWM cycle in your organisation and adhere to the necessary discipline, where do you think your organisation will see the biggest benefit?

A. Increased performance of assets

B. Reduction of risk

C. Effective cost management

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What good looks like in maintenance work management

The achievements of an organisation are the results of the combined effort of each individual.

- Work is assigned and delegated.
- Completed work is recorded.
- Only relevant work is approved.
- The budget is controlled.
- Coordination with other departments is in place (Operations, Supply Chain).
- Maintenance history is captured and applied.
- Quality can be controlled (work orders and over-inspection).
- Responsible and accountable roles are specified.
- Processes are measured and controlled.
- The right work is performed reliably.

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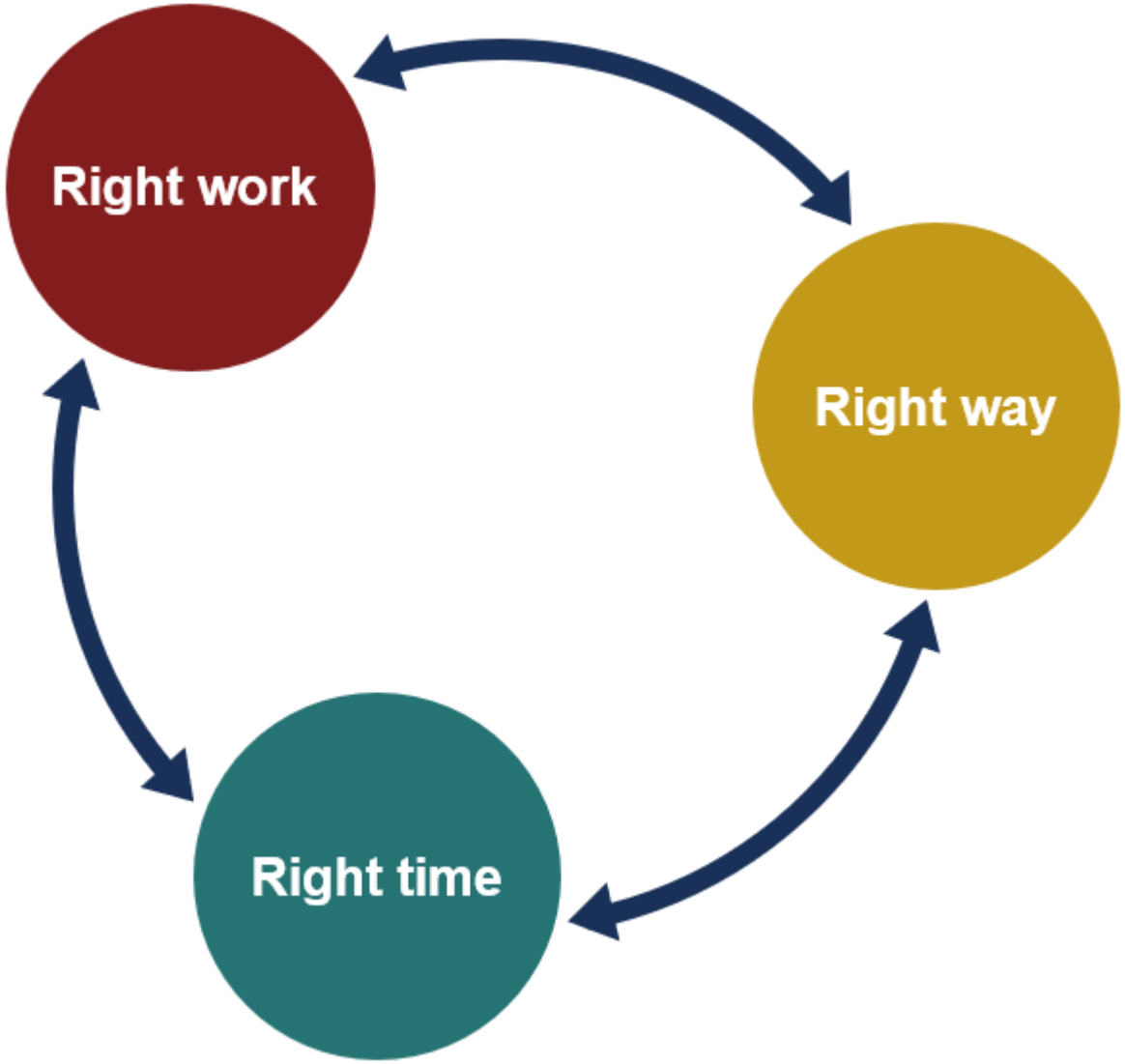
The motto of maintenance



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Do a checklist for your plant

Individually look at each of these benefits and ask the question: Are we getting this right at my plant?

Give yourself a score out of 11 and type your answer into the public chat. How many Yes answers?

1. Assign and delegate work
2. Record that work was done (statutory implications)
3. Ensure only relevant work is approved
4. Budgetary control
5. Coordination with other departments (Operations, Supply Chain, contractors)
6. Capture maintenance history for future analysis
7. Identify improvements
8. Quality control (work order, over-inspection)
9. Clear accountabilities and responsibilities
10. Enables us to measure and control processes
11. Perform the right work reliably

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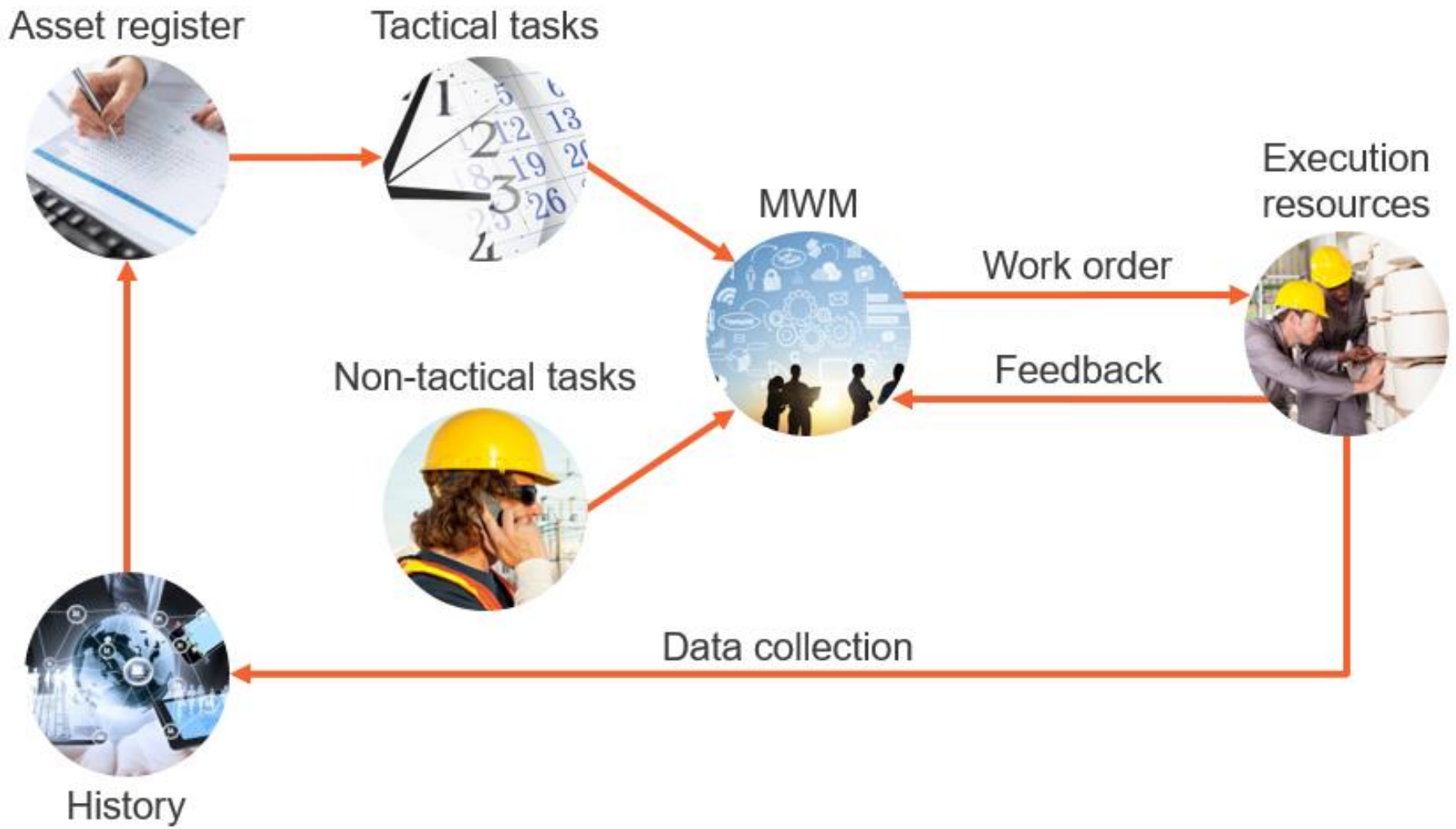
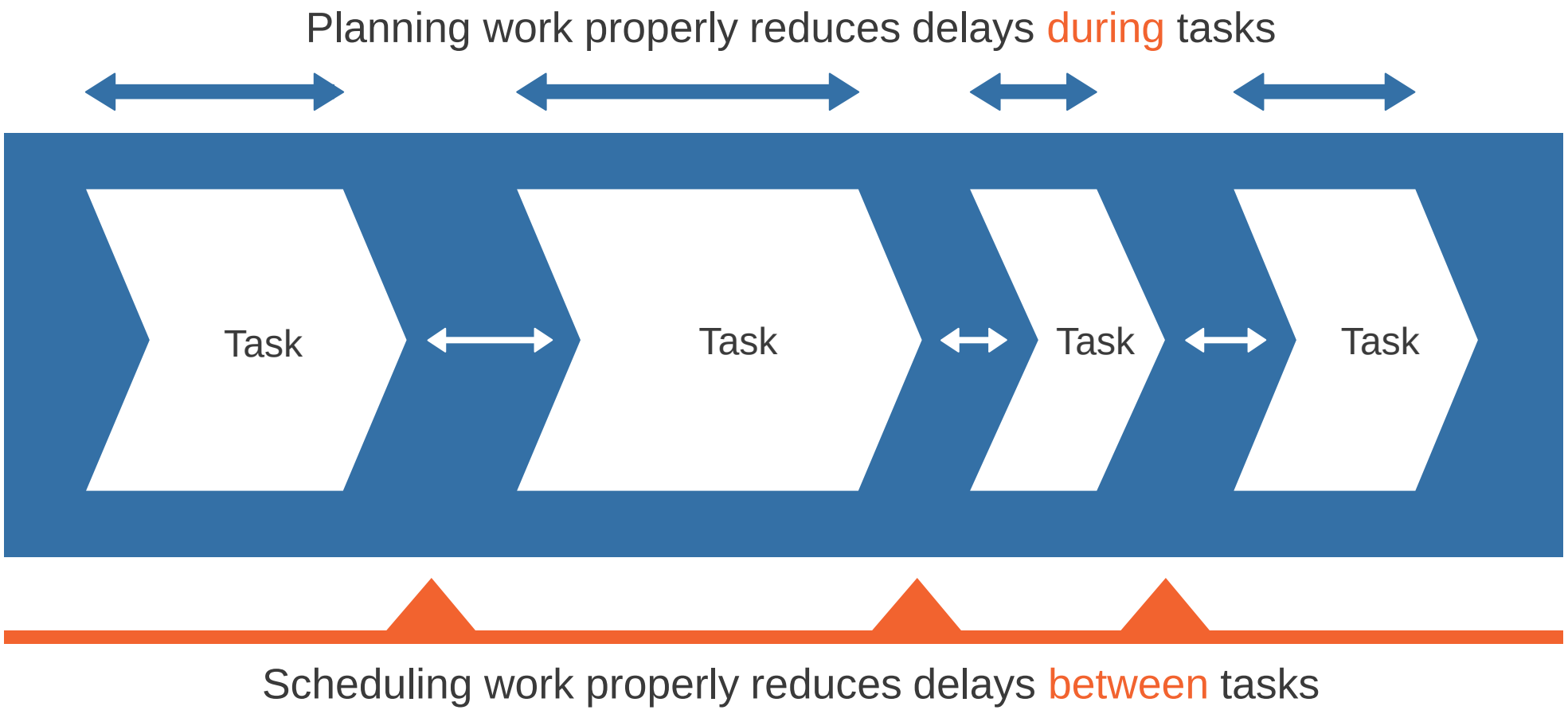
Maintenance work management in principle



Time optimisation: task duration and task logistics



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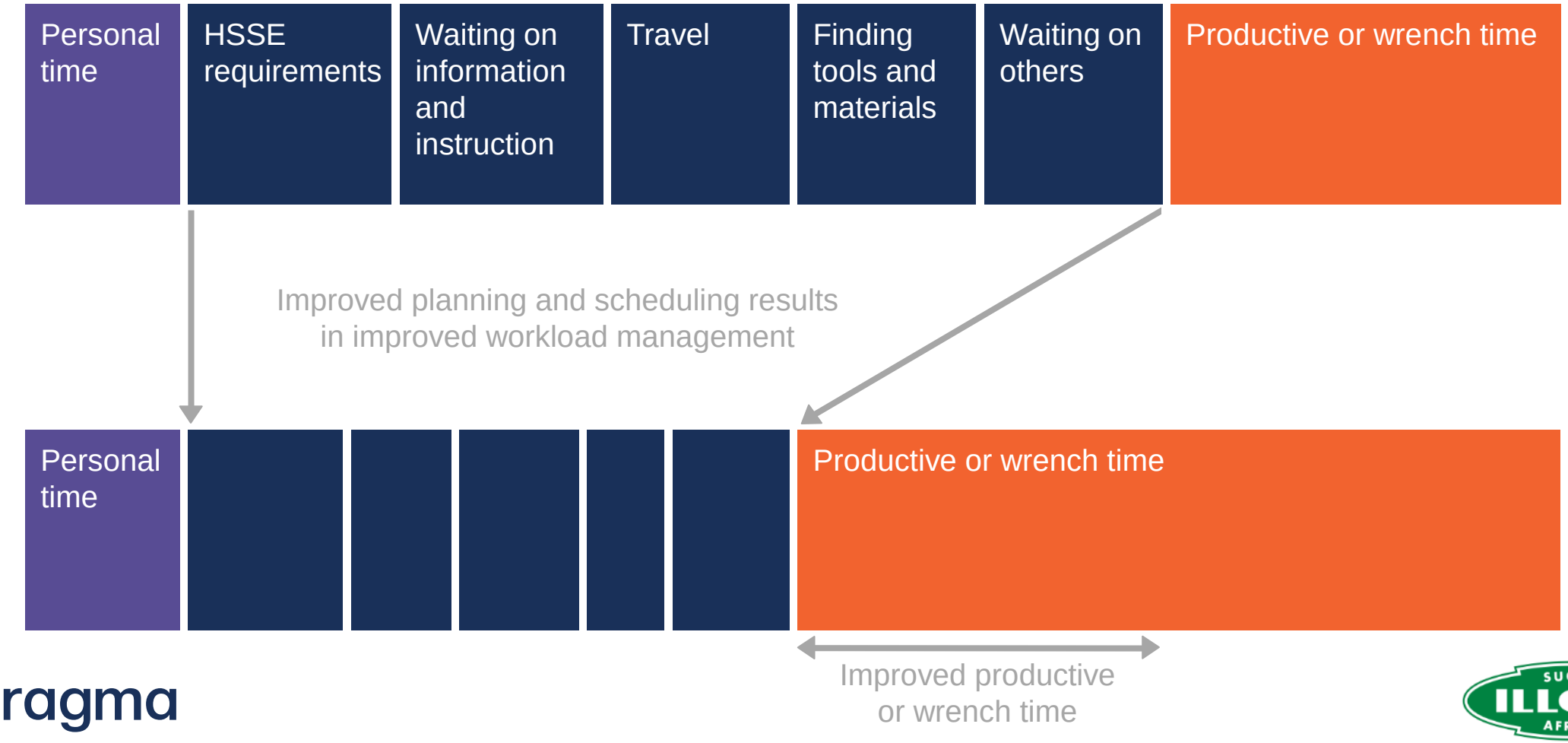
Time optimisation: wrench time

Why do we need to plan and schedule?

More maintenance work is accomplished in less time using the same resources



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Skills required for planners and schedulers

Analytical | Facilitation | Communication | Conflict resolution | Leadership | Mentorship | Negotiation

Join your breakout room and choose any three of the skills mentioned here (or others) and think of an example of where the skill will come in handy when doing your job.

Example: mentorship, taking an inexperienced apprentice in and being able to guide and support respectfully throughout the process.

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Side view of a US military aircraft

Inside view of the aircraft

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Close-up of the tail

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Side view of the other side

Clue: it did not land, it did not move. Only Maintenance was involved.

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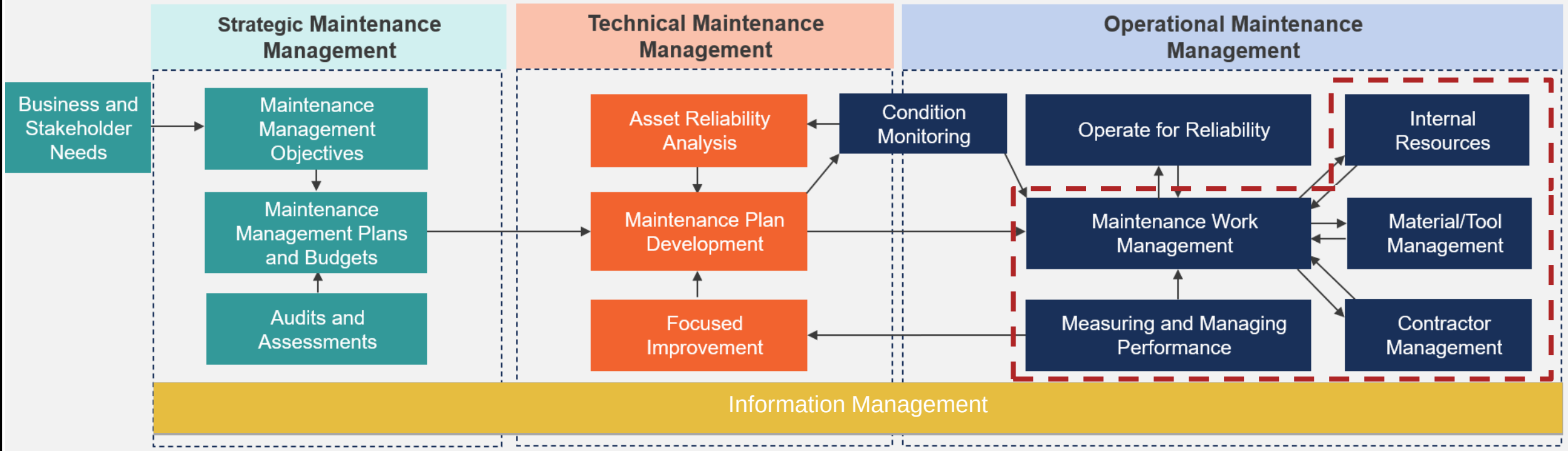
Where are we now?



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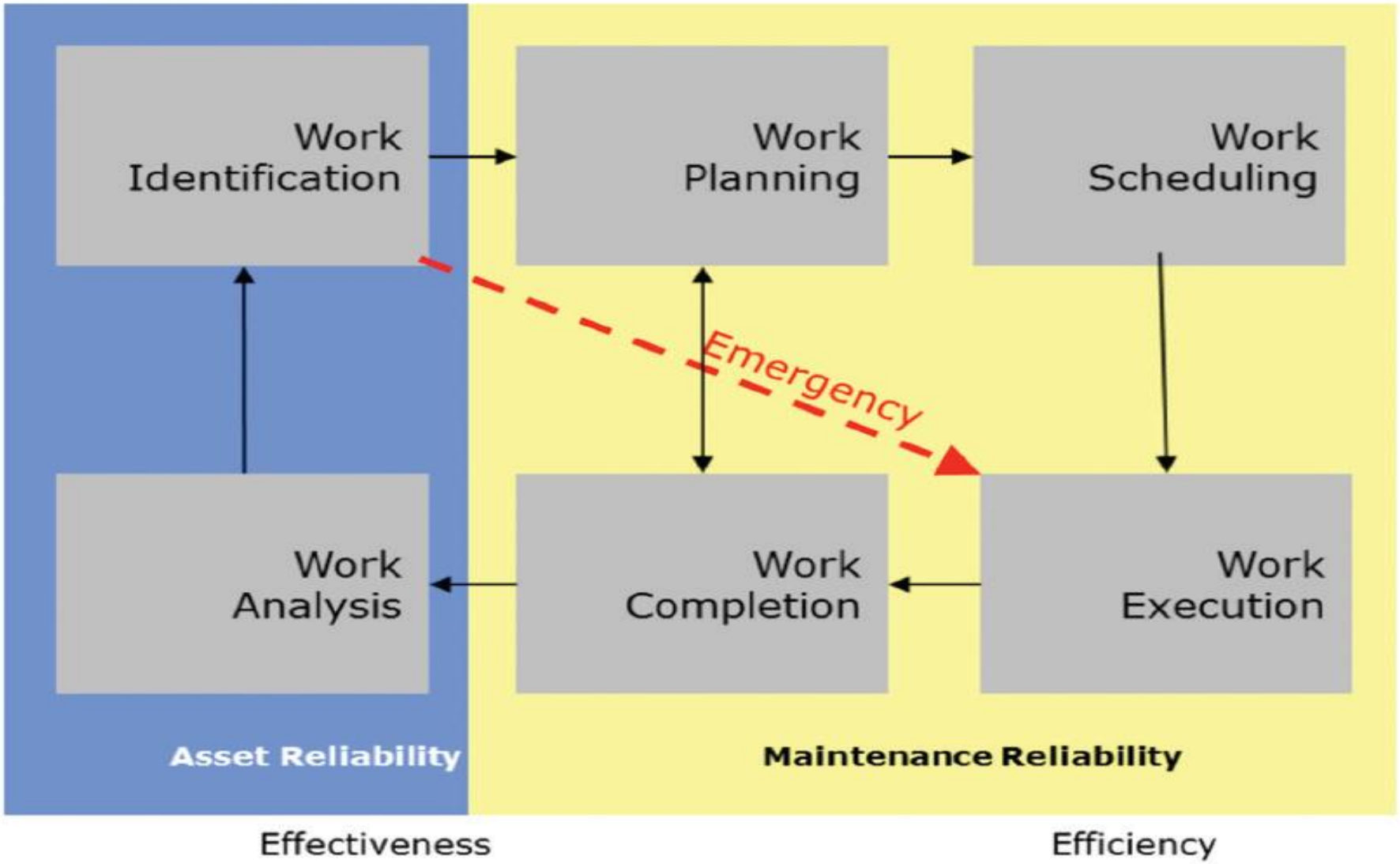
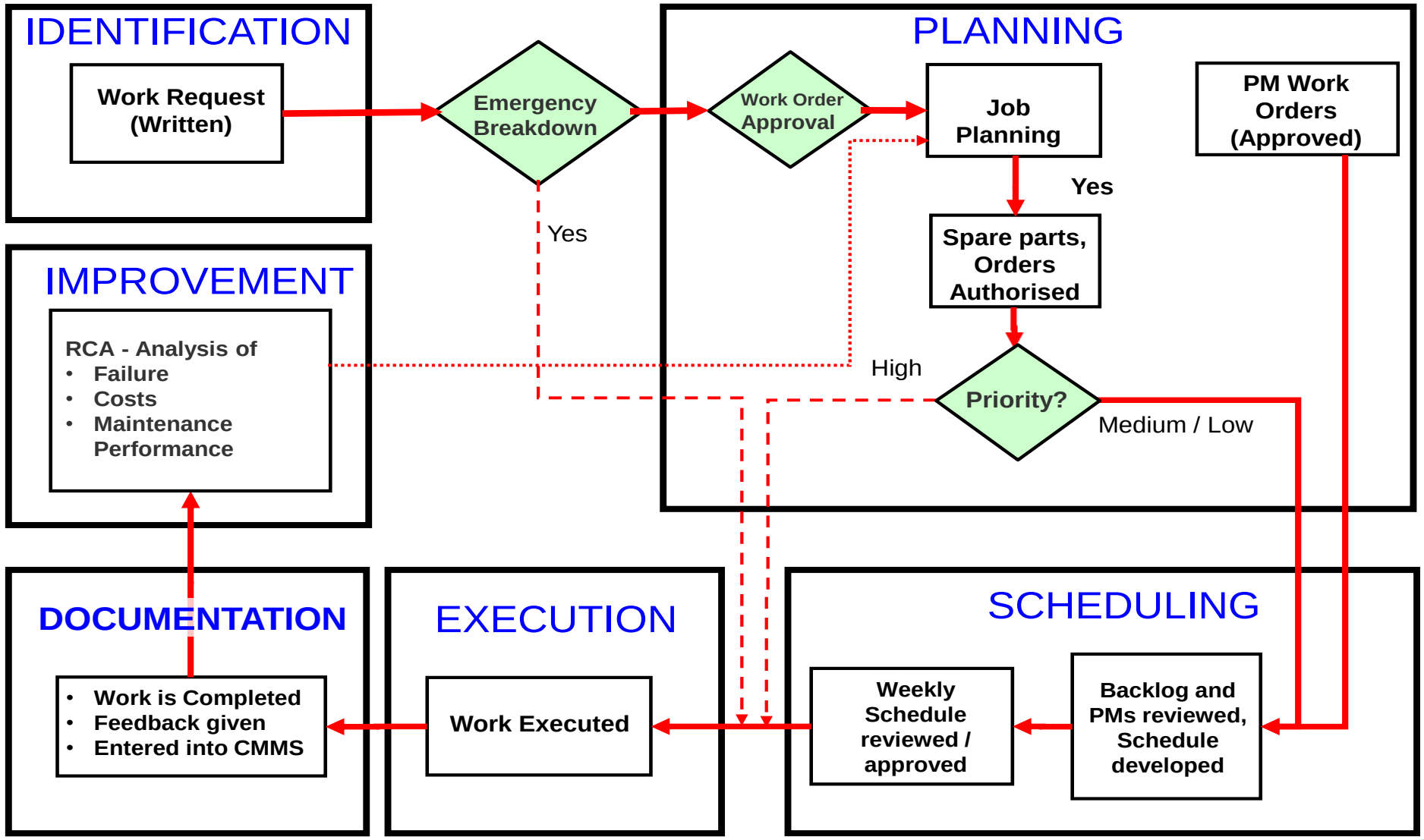
Work effectiveness and efficiency



Illovo basic workflow process



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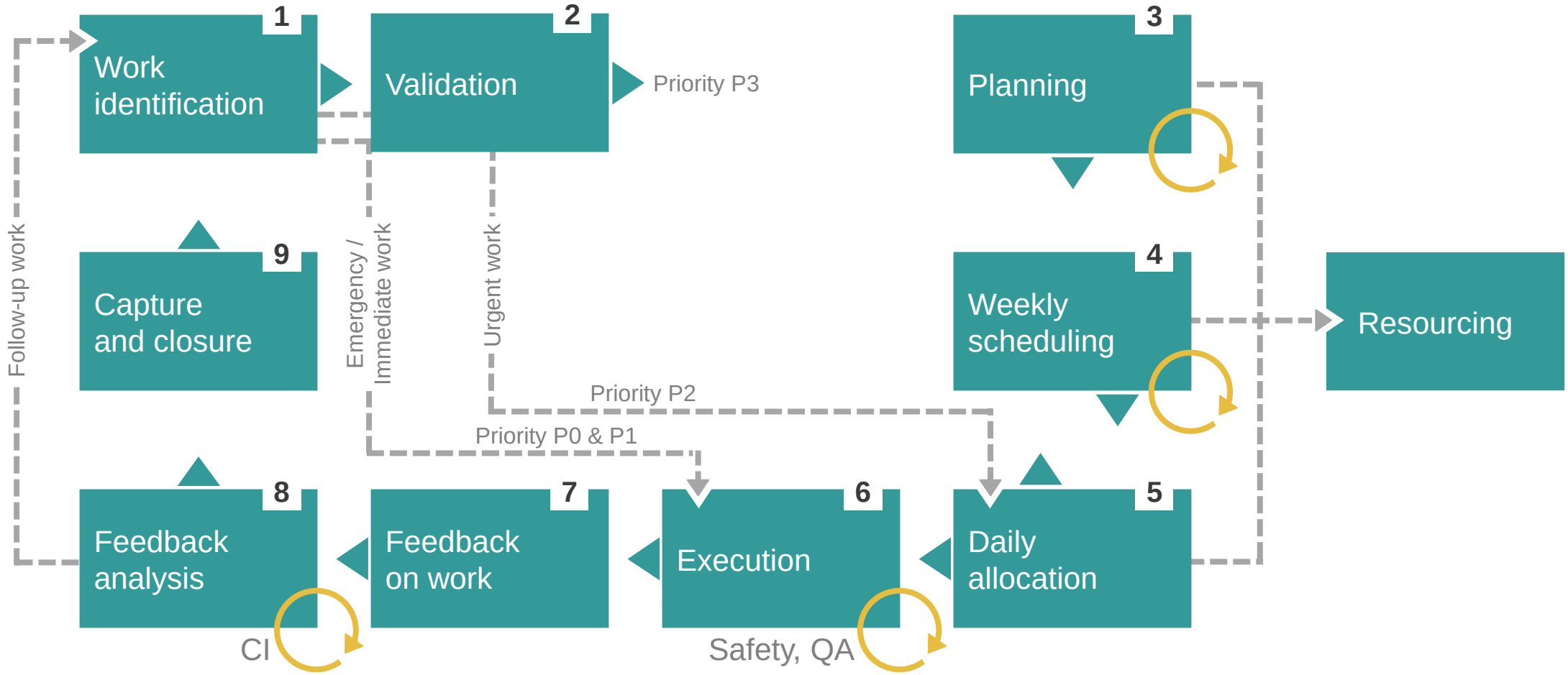
Work management process



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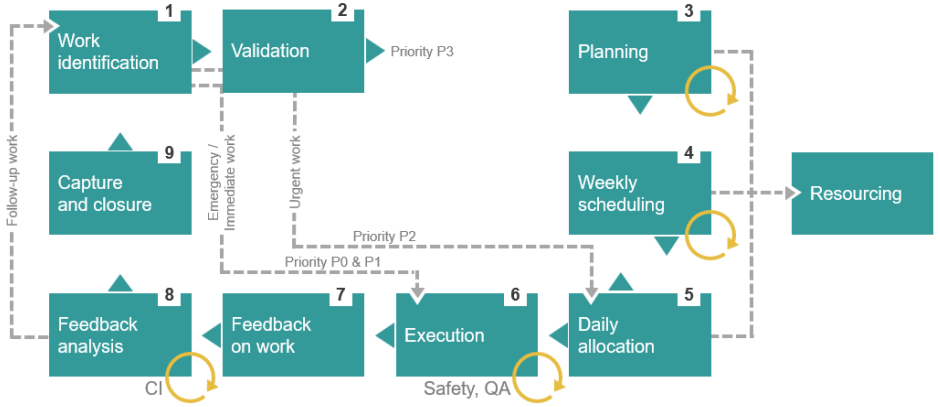
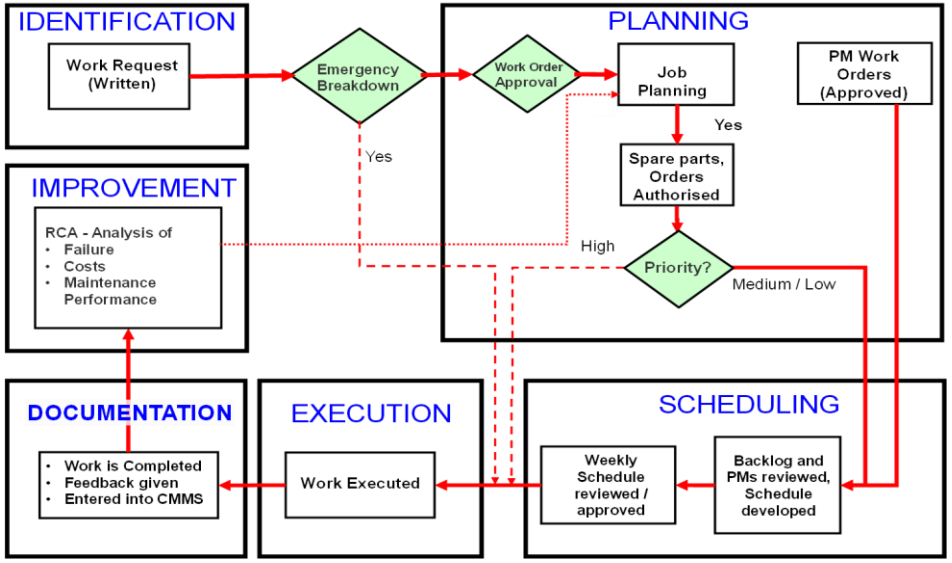
Let us compare

Refer back to the two images from the previous slides. Join your group and discuss the pros and cons of each of the models, considering the following aspects:

1. How easy is it to follow the MWM cycle? Could you easily explain it to someone else?
2. Are all the important activities evident in the MWM cycle? Which process steps, if any, are missing?
3. Is it clear who is responsible for what process step in the MWM cycle?





Reflect on the learning objectives of this module

Are you able to:

- distinguish between the different drivers to make maintenance decisions
- explain the goals and benefits of a disciplined maintenance work management cycle
- explain the importance of time optimisation
- identify skills needed to be successful in the modern day workplace as a planner or scheduler
- explain how work management fits into the Maintenance Model?

A. Yes

B. No

C. Partially

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Module 02: Information Systems and Documentation

Maintenance Work Management

Learning objectives for this module

After completing this module you will be able to:

- identify all the applicable information systems and software systems currently used in your business
- match different information systems to the appropriate place in the maintenance work management cycle
- list the most important steps to ensure effective storage, usage and control of relevant documents.

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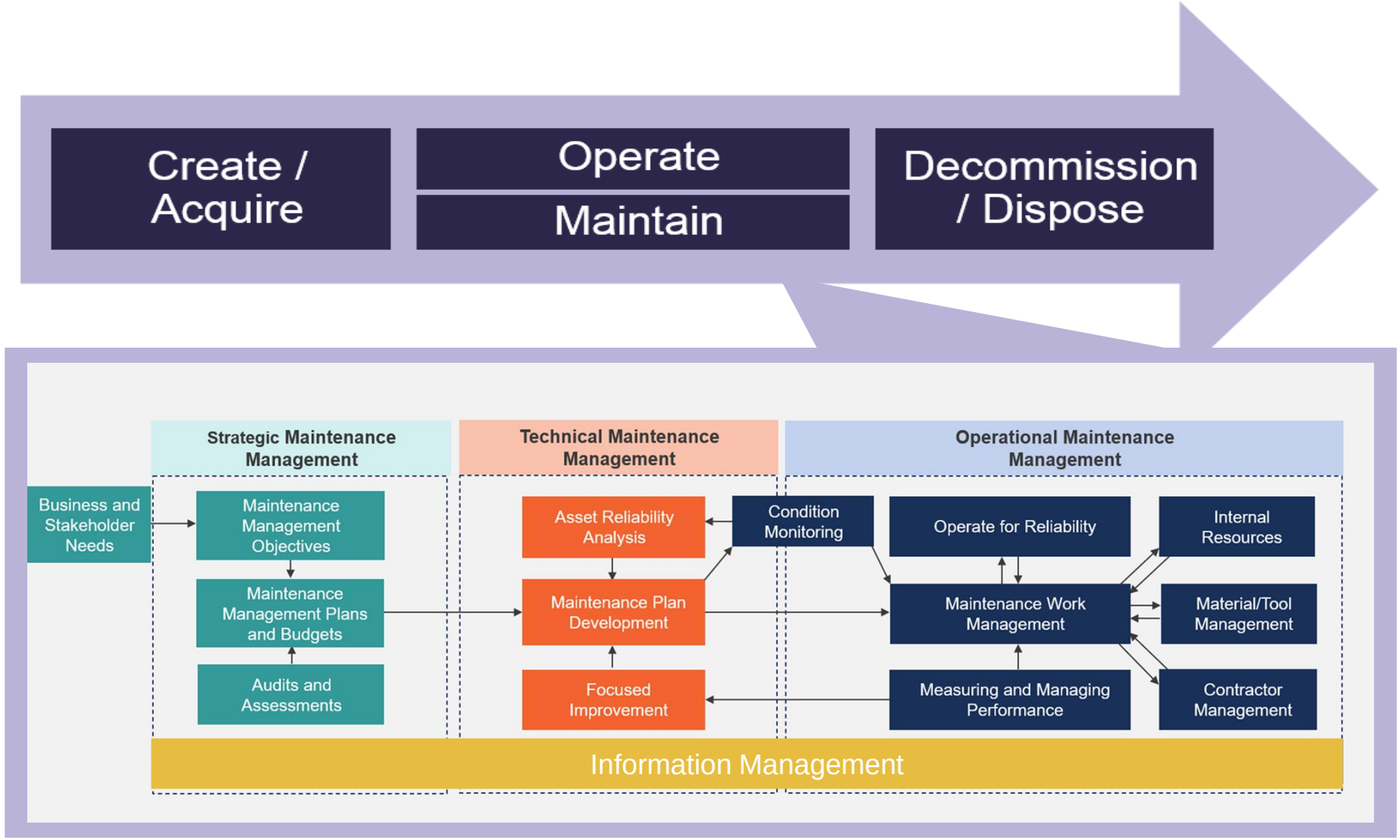
Asset life cycle



Information systems, software, tools and platforms

Across the life cycle of an asset many different information systems, computer software applications packages and tools are used to capture data and manage information.

Use the shared notes function to type up the different computer applications that are used within your organisation.

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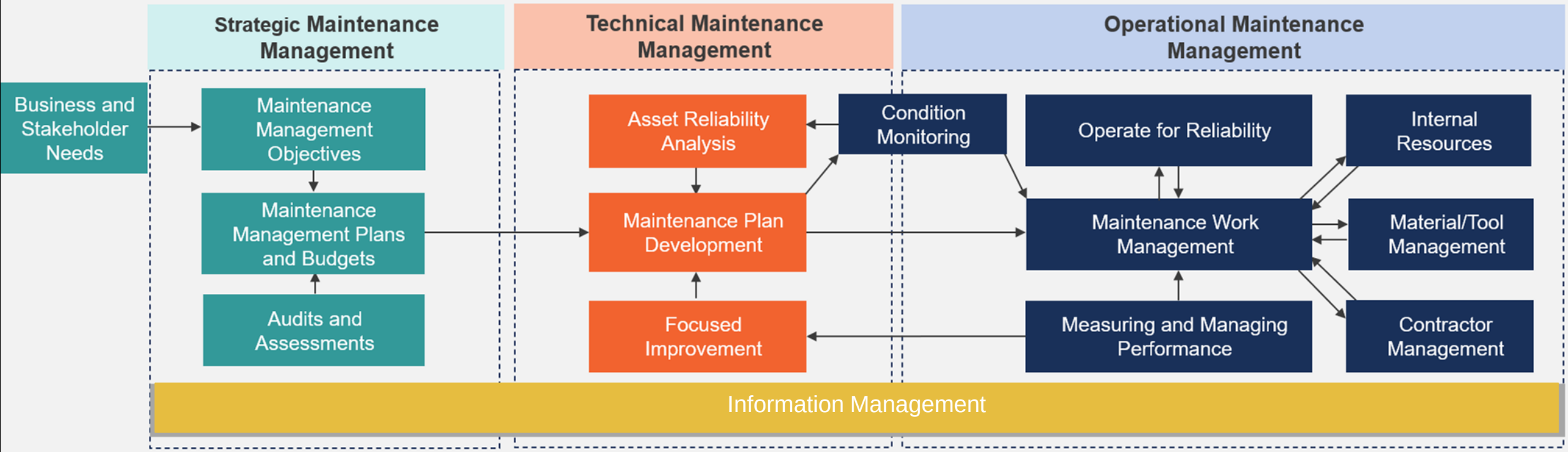
Where to use it

Join your breakout room to map the relevant computer systems and applications within your organisation to each of the areas within the Maintenance Management Model.

The model is on the next slide.

You will be asked to share your answers in the discussion after you have completed the activity.

The Maintenance Management Model



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The need for document control

Maintain

Support

Retain

Compliance

“Maintain documented information to the extent necessary to support the operation of processes and retain documented information to the extent necessary to have confidence that the processes are being carried out as planned.”

ISO 9001:2015 Clause 7.5

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The benefits of document control

- Compliance
- Assigns accountability
- Information transparency
- Management of change
- Disaster recovery
- Problem-solving
- Process optimisation

A well-designed documented system has many benefits:

- Demonstrates compliance with relevant legislation, ie ISO standards, DMR, DOL, various workplace inspections.
- Properly controlled statutory documents can be used during audits and investigations to ensure that processes and procedures are being properly followed.
- Enables the organisation to investigate system and process changes / change logs to stabilise or correct systems or processes that have gone wrong.
- Enables the review of inspection records, historical performance records and expenditure records to identify improvement opportunities.

The steps to ensure document control

Develop and review information for relevant assets

Store documentation correctly

Audit the system and the data

Train personnel and provide access to the data

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Rate the document control process at your organisation

Taking into account what you have learnt here about document control, the features and benefits, how would you rate the current system at your workplace?

A. We are on top of our game!
B. We are doing okay, but there is room for improvement.
C. It is a constant struggle…
D. We are nowhere close and need a new system.

Reflect on the learning objectives of this module

Are you able to:

- identify all the applicable information systems and software systems currently used in your business
- match different information systems to the appropriate place in the maintenance work management cycle
- list the most important steps to ensure effective storage, usage and control of relevant documents?

A. Yes

B. No

C. Partially

Module 03: Validation and Approval Process

Maintenance Work Management

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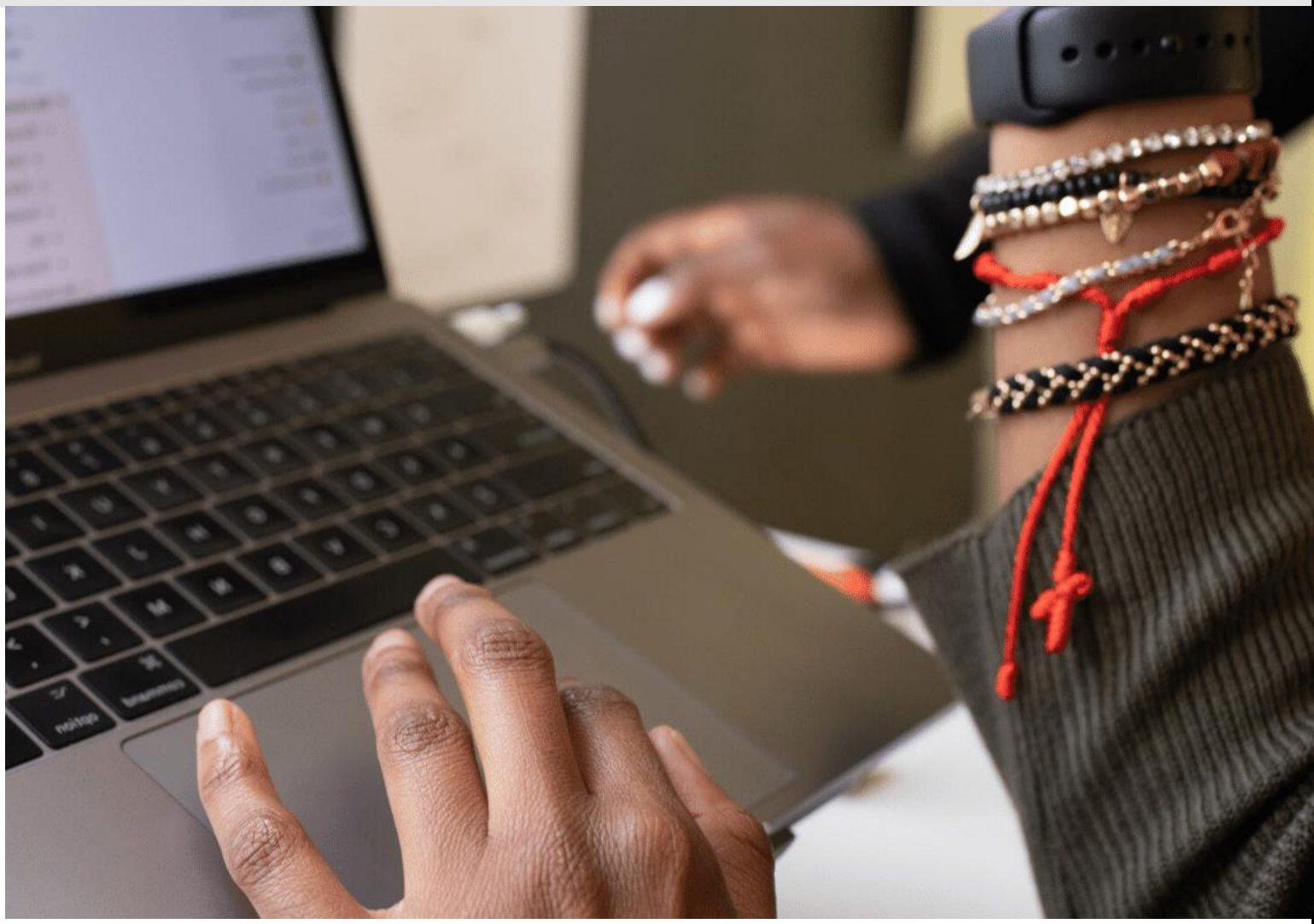

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Learning objectives for this module

After completing this module you will be able to:

- differentiate between the different sources of maintenance work
- explain the requirements and controls to achieve quality within the work identification process
- differentiate between the different outputs of the work validation process
- explain the purpose and factors which influence the validation process
- distinguish between immediate, urgent and planned work and the impact on the schedule
- identify, describe and assign appropriate codes when validating work.

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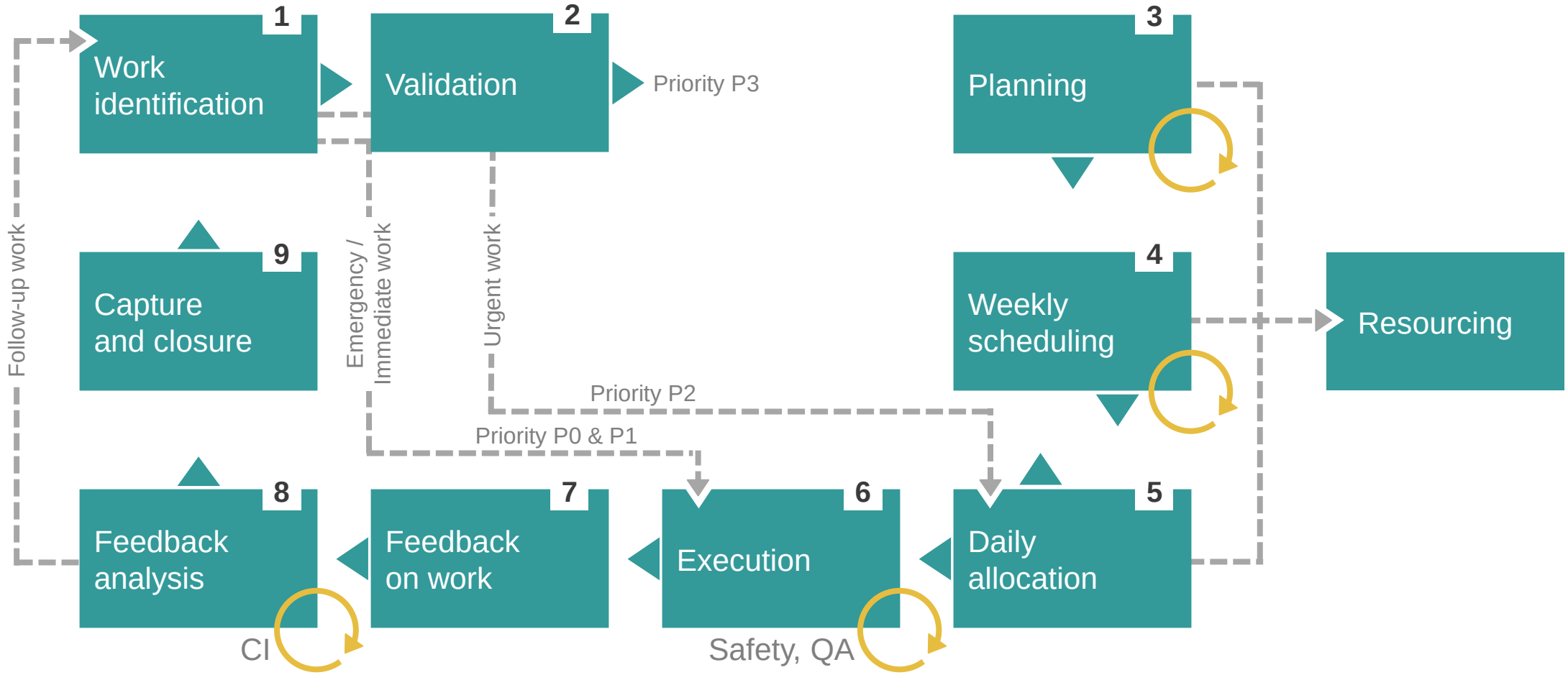
Maintenance work management cycle



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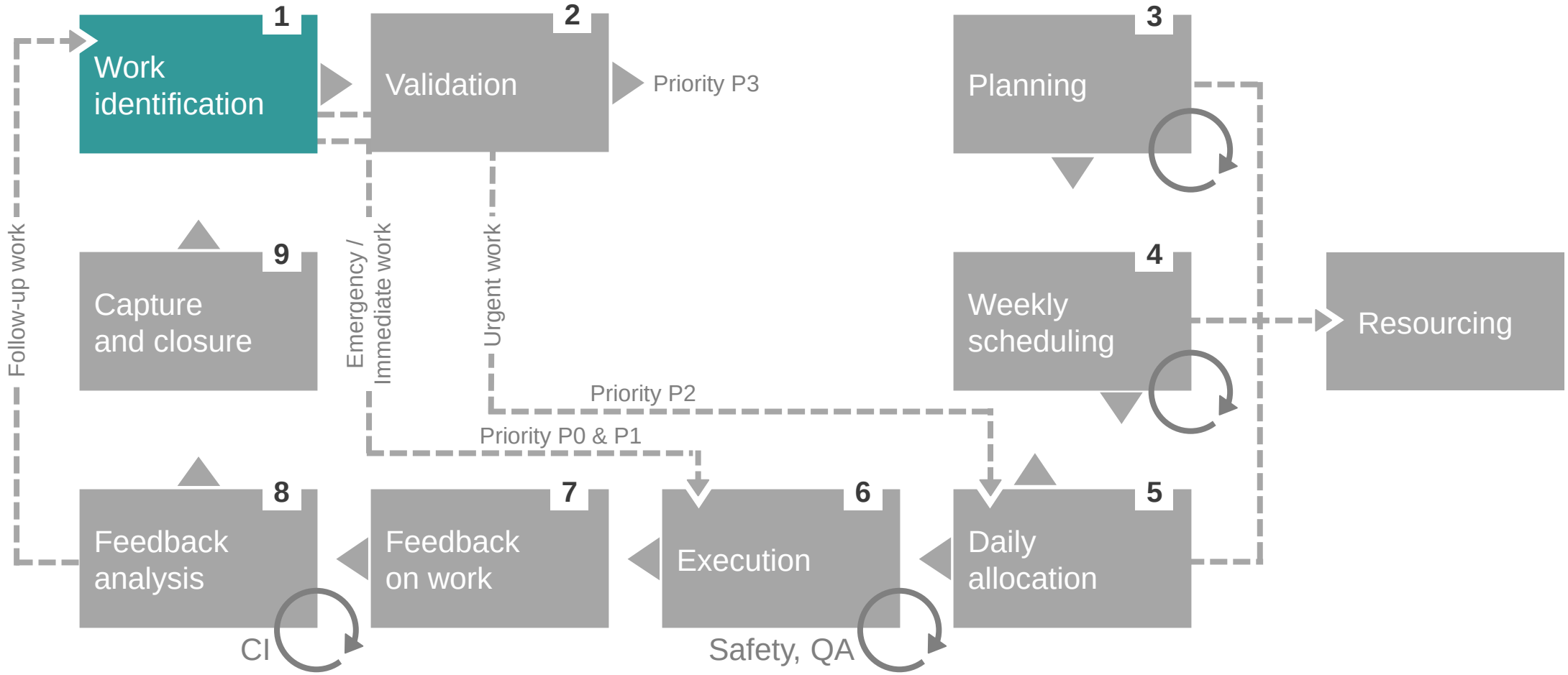
Work identification

Position in the maintenance work management cycle



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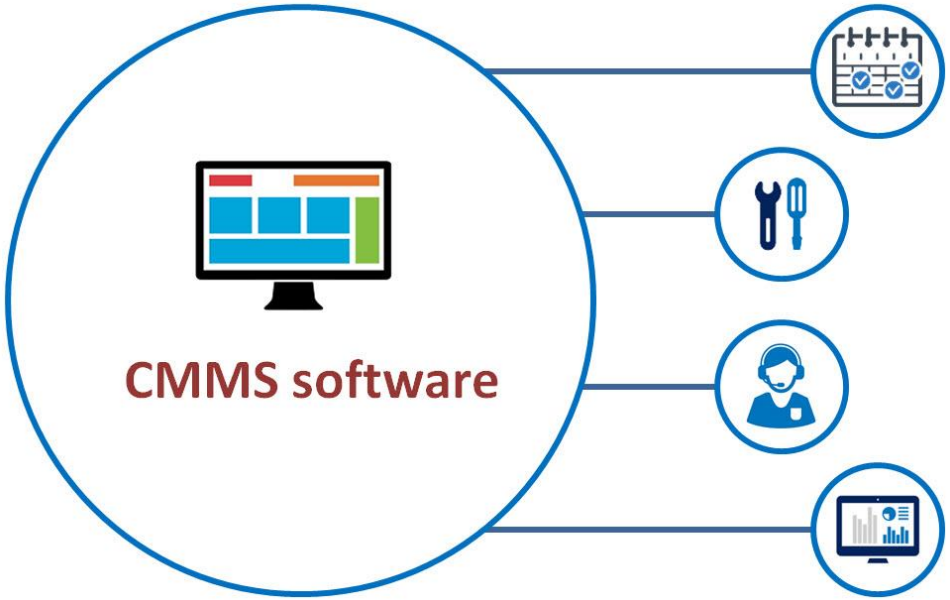
Maintenance sources

What are sources of maintenance work in your organisation?

Type your answer in the shared notes.



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The three main sources of maintenance work

1. **Work scheduling system**: tactical work arising from long- and medium-term maintenance work schedules

2. **As required work:** non-tactical work due to breakdowns and maintenance requests arising

3. **Follow-up work:** work arising from maintenance work schedules including condition monitoring

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Work orders and the CMMS

What happens if the asset is not in the CMMS? How do you create a work order then?

Type your answers into the public chat.

Controls for maintenance work

A formal maintenance work management process is essential for the control of maintenance work, especially for non-tactical work requirements.

- All requests must be received via notifications using the ERP system.
- Notifications are validated as being necessary and meeting the minimum information requirements according to the work requested.
- Notifications are evaluated to ensure that they are prioritised according to the impact and urgency of the work.

Work identification

Proper tools and infrastructure must be provided to support the work identification business process on a site.

- Draw or describe the process steps and responsibilities for generating notifications at your site.
- Consider all three notification types.
- What goes wrong? Why?

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Categories of notifications

Most organisations make it as simple as possible for anyone to open a notification, but only after validation will a work order be created.

This creates its own challenges as not all notifications will become work orders.

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Why different notification types?

Notification types allow the sorting and analysis of maintenance work.

Codes for typical groupings that can be required:

- Notifications for breakdown work versus notifications for maintenance work
- Notifications for master data update requests
- Notifications for refurbishment requests

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Design effective work requests

Join your breakout room and discuss the following questions:

- How much time is wasted if the work request details are not properly captured?
- What information is mostly lacking or insufficient on the work request?
- What do you think can be done to ensure that work requests are completed effectively?

Discuss these questions and then paste your notes into the public chat when you return to the main classroom.

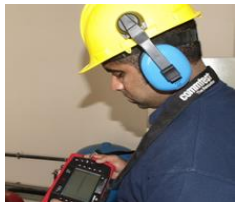
Information requirements for work requests

The more detail provided on the original notification, the easier and more efficiently the work will be processed.

Minimum notification information that must be provided:

- Functional location code of the equipment on which work has been requested
- Brief description of the problem and outcome required
- Date by which the required work must be complete
- Priority code (ie emergency or corrective or planned?)
- Reported by and contact person

The impact of a quality request



Quality of requested information	Requester	Planner	Technician	Total time
	Time required by the person involved			
POOR	3 minutes	2 hours	2 hours	**243**
GOOD	5 minutes	30 minutes	1 hour	**95**

(Actual case study – copper mining operation)

2 min investment

Best 2 min investment ever made!

148 min return

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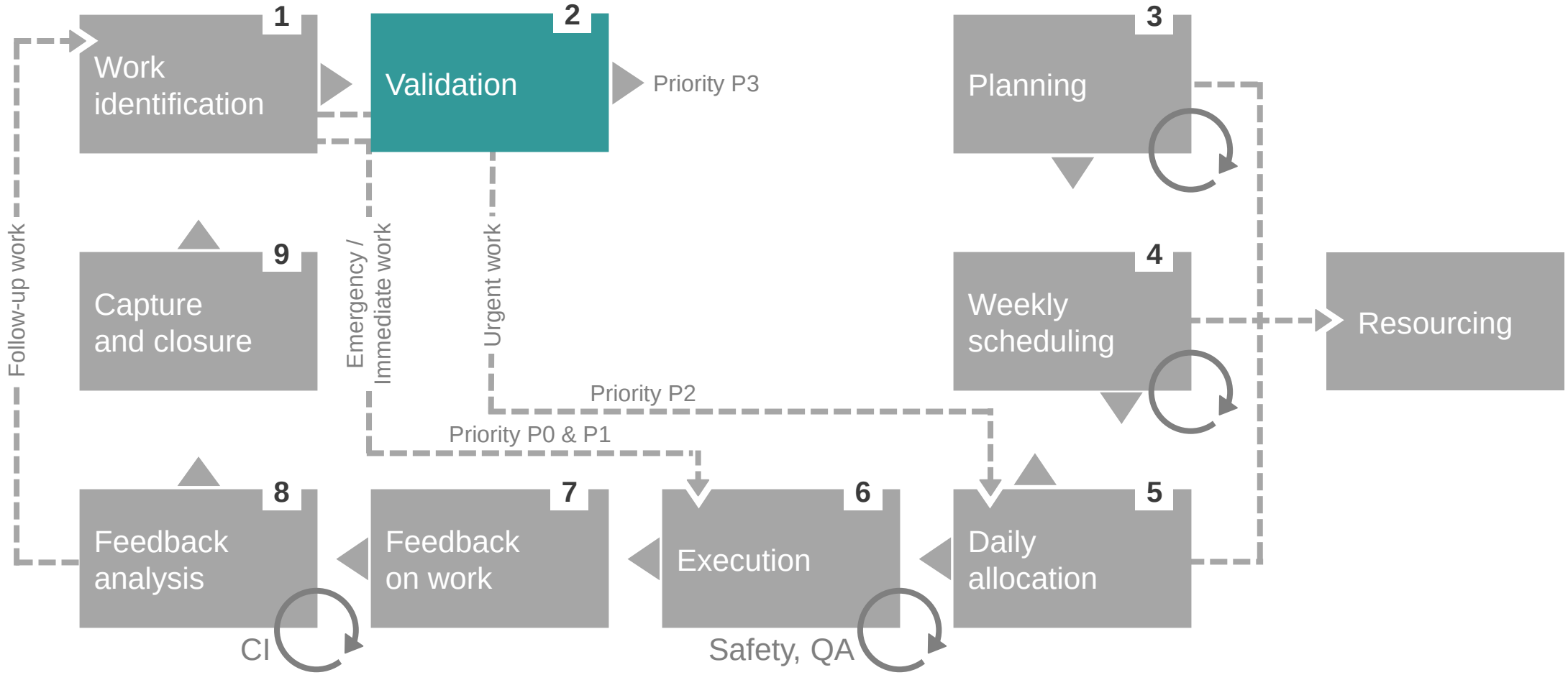
Work order validation

Work order validation

Before we can create documentation for work to be carried out by a technician, we need to ensure that the work is valid.

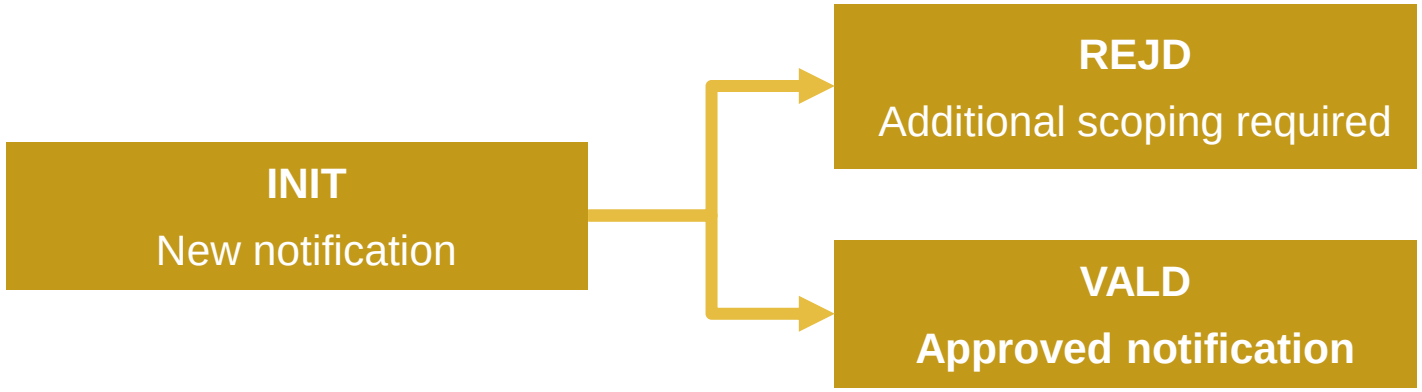
What do you think work order validation means?

Position in the maintenance work management cycle



Evaluating the notification

- Review list of open/new maintenance notifications.
- Work notification status:



- The list of new notifications must be reviewed by the maintenance foreman.
- Check for functional location and scope.
- Assess the scope of the notification to determine if more than one notification or notification type is required
- Select an existing task list for the work required.
- Where the task list does not exist, request a master data update through the maintenance planner or CMMS reliability engineer.

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Validation of work

All identified work must be validated, but not all identified work is necessarily formally planned.

- Identified work must be validated; one has to find out if the urgency is appropriate.
- Notifications must always be properly completed.
- Has the maintenance object been clearly and appropriately identified?
- Is there enough information to understand the required outcome from the request?
- Is the urgency of the request or notification appropriate?
- The work urgency determines the route through the work management cycle.

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The purpose of validation

Validation acts as a filter to prevent unnecessary WOs proceeding and filling up the WO process.

- Prevents duplication of non-tactical work.
- Identifies non-tactical work that is not business-related, personal requests or requests not aligned with the strategic direction of the organisation.
- Identifies tactical work that might not be required due to recent asset replacement or non-utilisation.

Unprogrammed, non-tactical work

Work orders are seen as validated notifications. Once the notification has been validated, the work order type determines the route that the work order will follow through the work management cycle.

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Validation needs decisions

- Is it a valid maintenance request?
- Has the maintenance object been clearly and appropriately identified?
- Is there enough information to understand the required outcome from the request?
- Is the urgency of the request or notification appropriate?

The urgency of the request will determine the WO route.

- Straight to execution
- Daily allocation
- Pass on to planning and scheduling?

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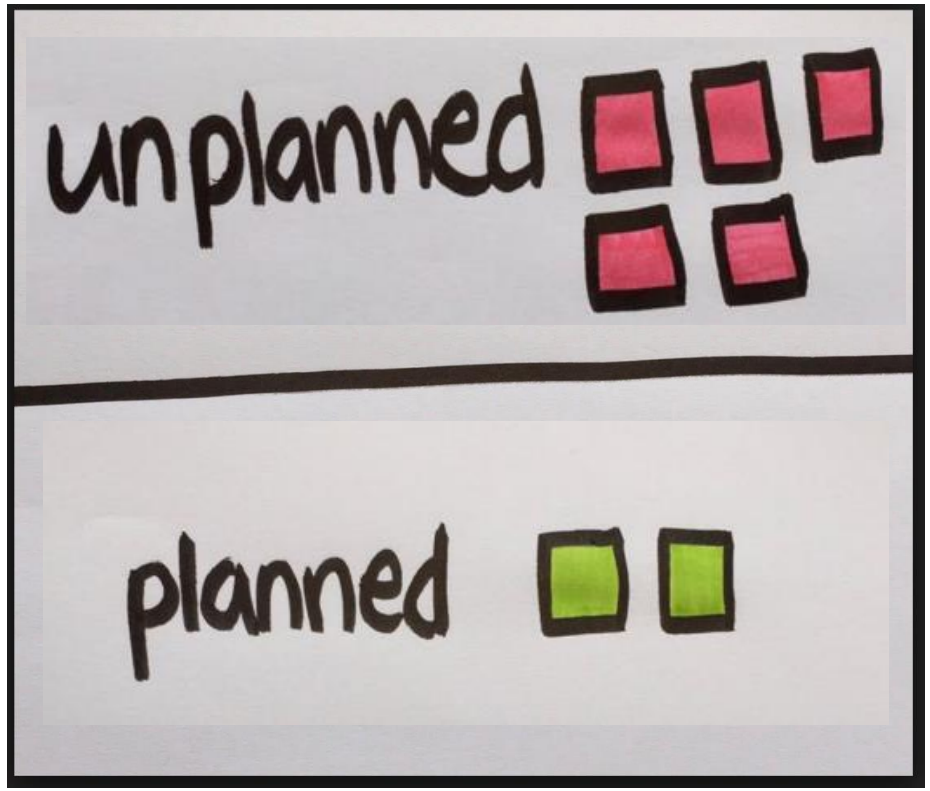
The three outputs of work validation

1. **Emergency maintenance / immediate breakdown maintenance**: operational malfunction (non-tactical) work that must be executed immediately due to its impact on operations, health, safety or the environment

2. **Urgent corrective maintenance:** non-tactical work that must be executed before the next work schedule period, ie with a planning lead time (PLT < 7 days)

3. **Planned work:** preventive maintenance (tactical) and corrective maintenance (non-tactical) work that will be planned and scheduled



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Approval of work orders

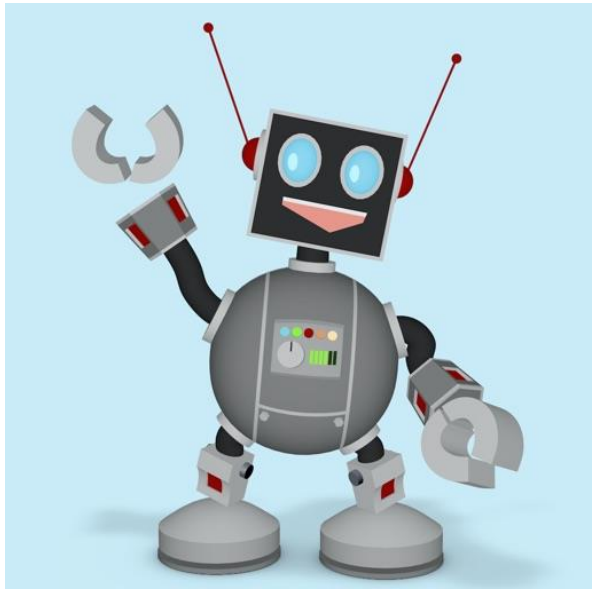
Who approves **work orders** and under what circumstances do they have the authority?

Type your answer into the Public chat.

Validation of emergency or immediate maintenance

1

All identified work must be validated, emergency or immediate maintenance must start immediately, and work must continue until it is complete. The failure must have a high impact on safety, environment, health or operational capability.



- Emergency or immediate maintenance is requested by the process operator, directly with the maintenance technician.
- The **emergency work order** gives the requestor the authority to execute with a fully authorised requisition, ie spare parts or suppliers get issued immediately.
- Resources needed for immediate or emergency maintenance are either:

  - not required, ie spare parts
  - immediately available (within 24hrs) through expediting or stores.

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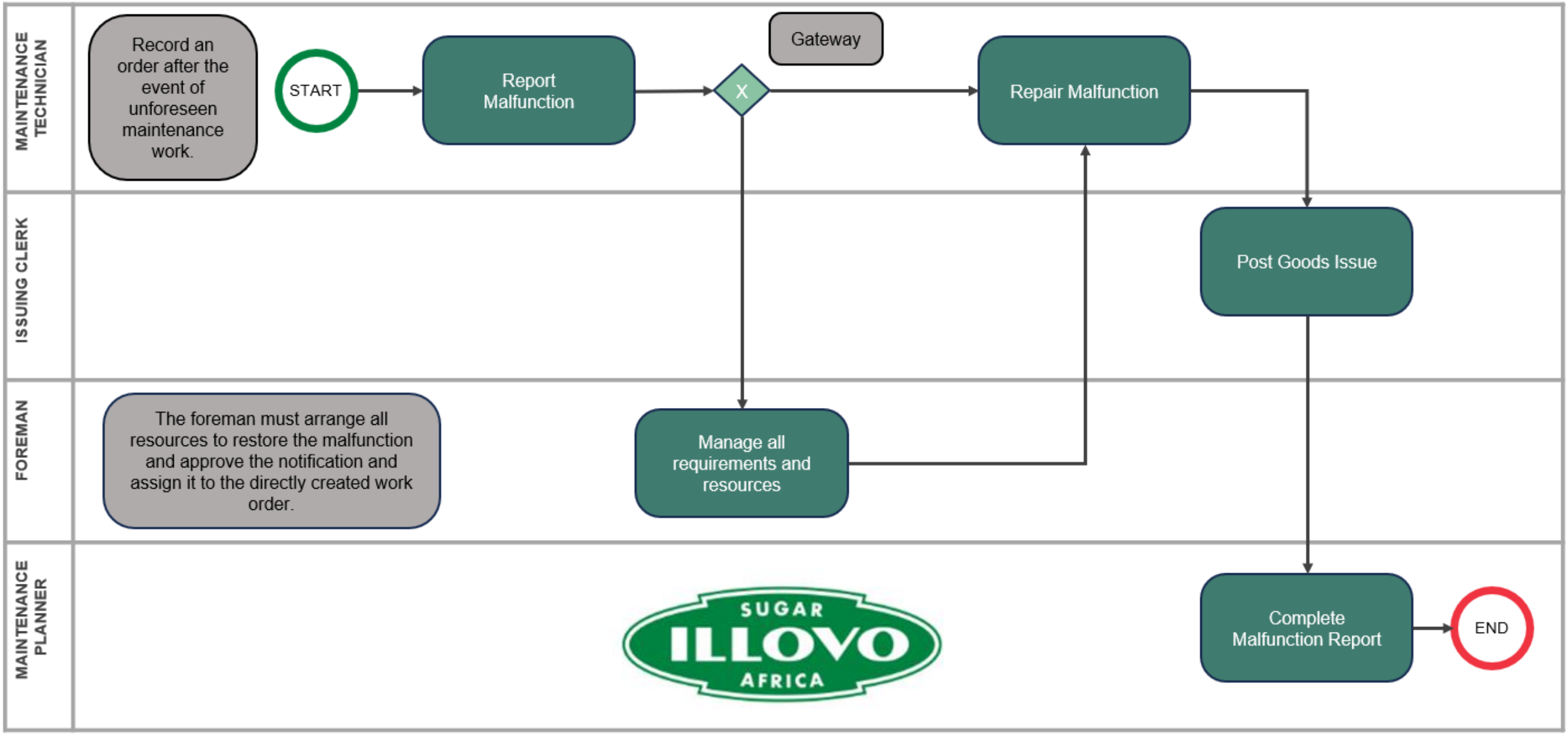
Emergency or immediate maintenance



Determine required date based on impact

Required by date		Impact	
Today	Date by which an event that will create a health, safety or environmental event is probable	High	Significant or uncontainable health, safety or environmental threat **OR** Significant unrecoverable production throughput or quality reduction
This period	Date by which delayed completion of a critical scheduled activity is probable	Moderate	Containable health, safety or environmental threat **OR** Recoverable production activity throughput or quality reduction
Next period +	The agreed service level period from date of work request (not more than six weeks)	Low	All others

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Validation of urgent corrective maintenance

2

All identified work must be validated and urgent corrective maintenance will delay or postpone preventive work scheduled for the period.

- Urgent corrective maintenance is requested by the operator, directly with the technician/artisan.
- Equipment is in an unstable condition and if not attended to on an urgent basis, it will lead to an unacceptable risk. There is no standby equipment available.
- The technician/artisan (execution resource) determines that required resources are not immediately available (within 24hrs).
- The maintenance foreman is informed and activates appropriate processes to prioritise the availability of required resources or changes the urgency of the work.
- The maintenance foreman provides feedback to the operator and operations foreman.

pragma

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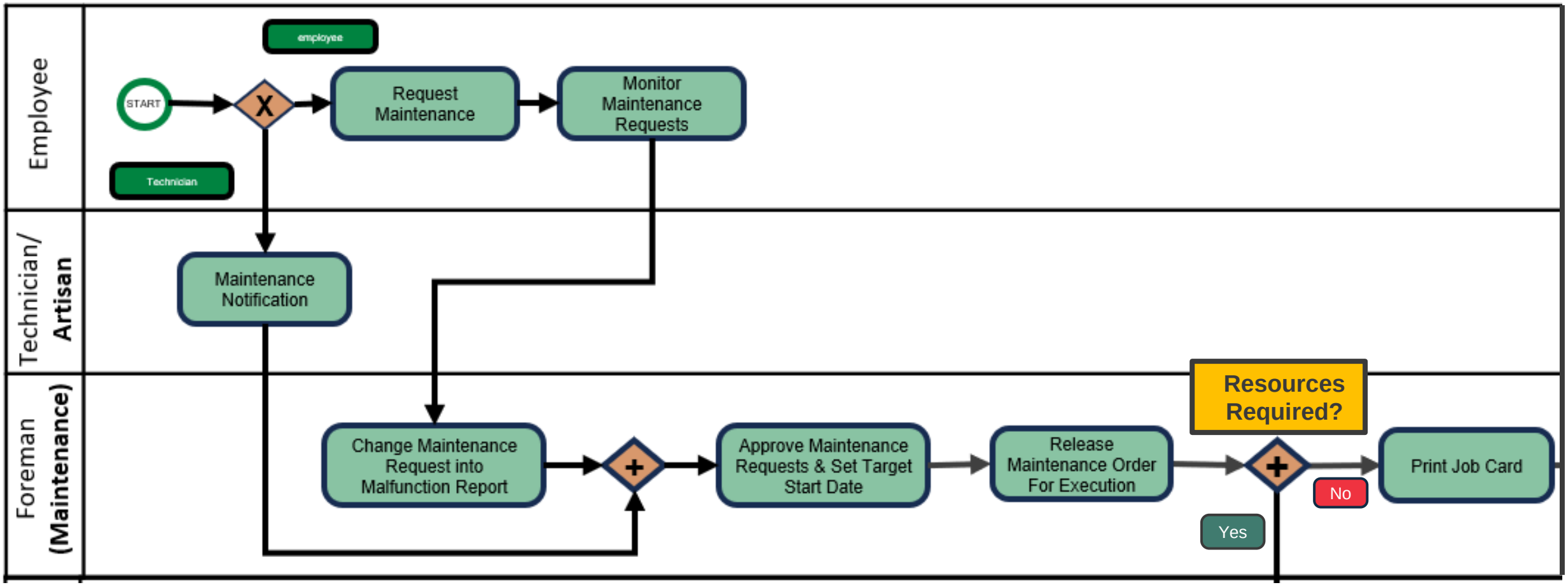
Urgent corrective maintenance (PLT* < 7 days for resources)



* PLT – planning lead time

pragma

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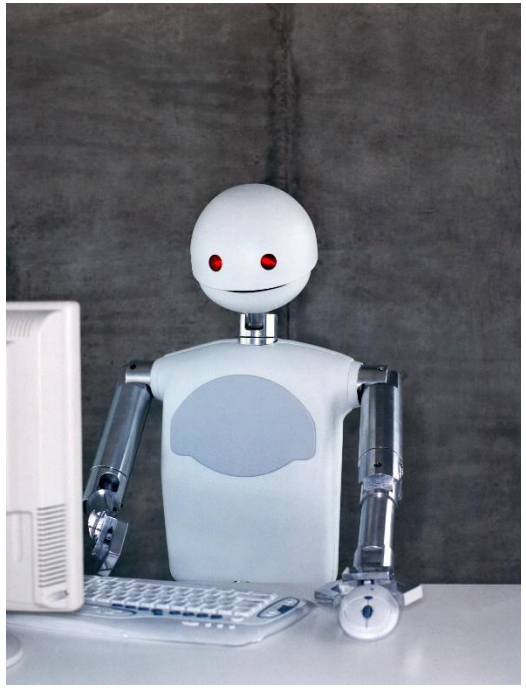
Validation of planned work

3

All identified work must be validated, and planned work must be necessary, relevant and have funds available.



- Defined activities and frequencies are set up in the system to drive routine maintenance, both time-based and performance-based.
- Corrective work with a planning lead time (PLT) greater than seven days should be planned.
- Work arising from inspections, including condition monitoring feedback, should be planned.
- All planned work should have an upper cost limit determined during validation for work approval purposes.
- All planned work must be reviewed and coded within one working day of the notification generation date.

pragma

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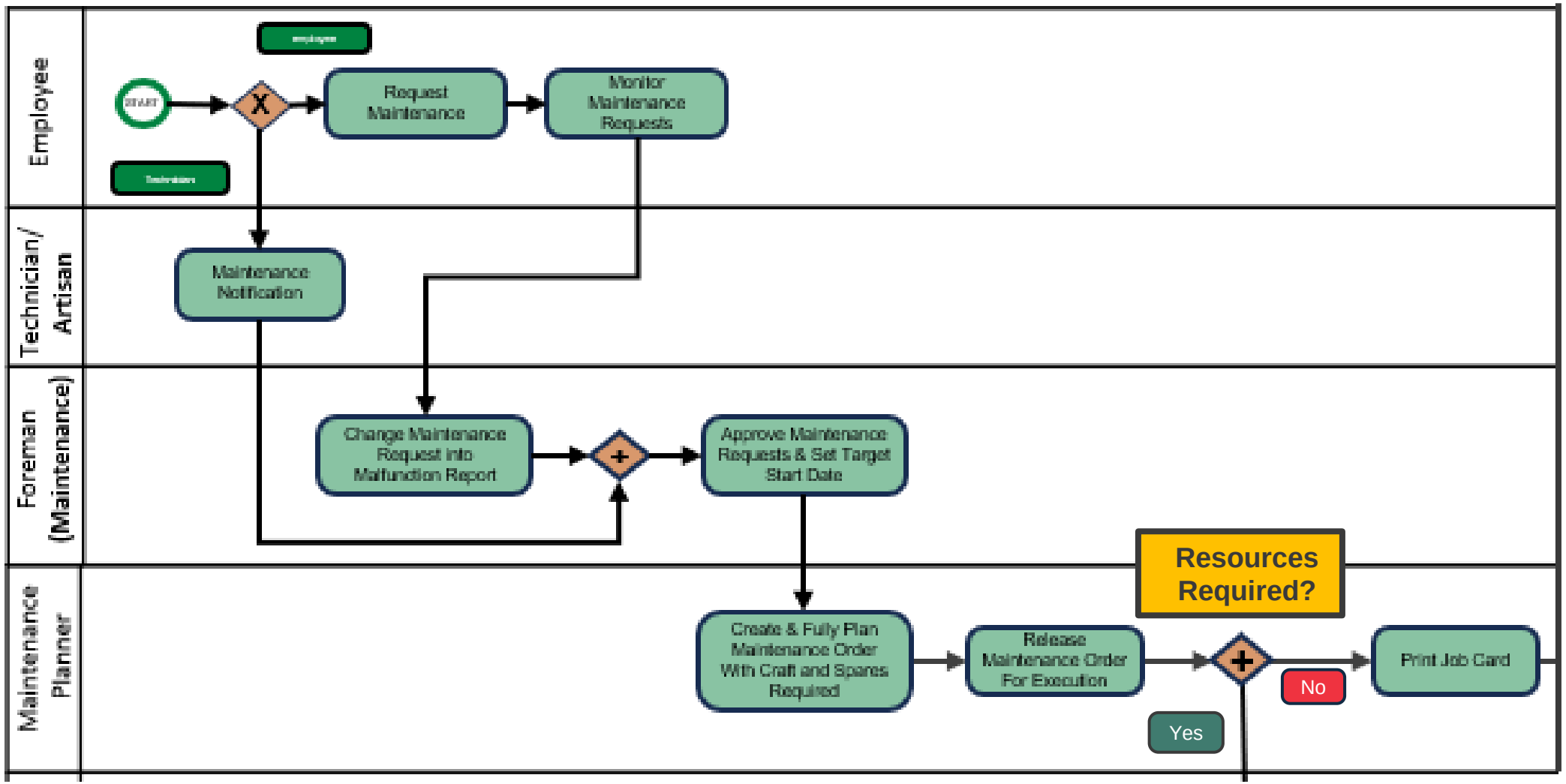
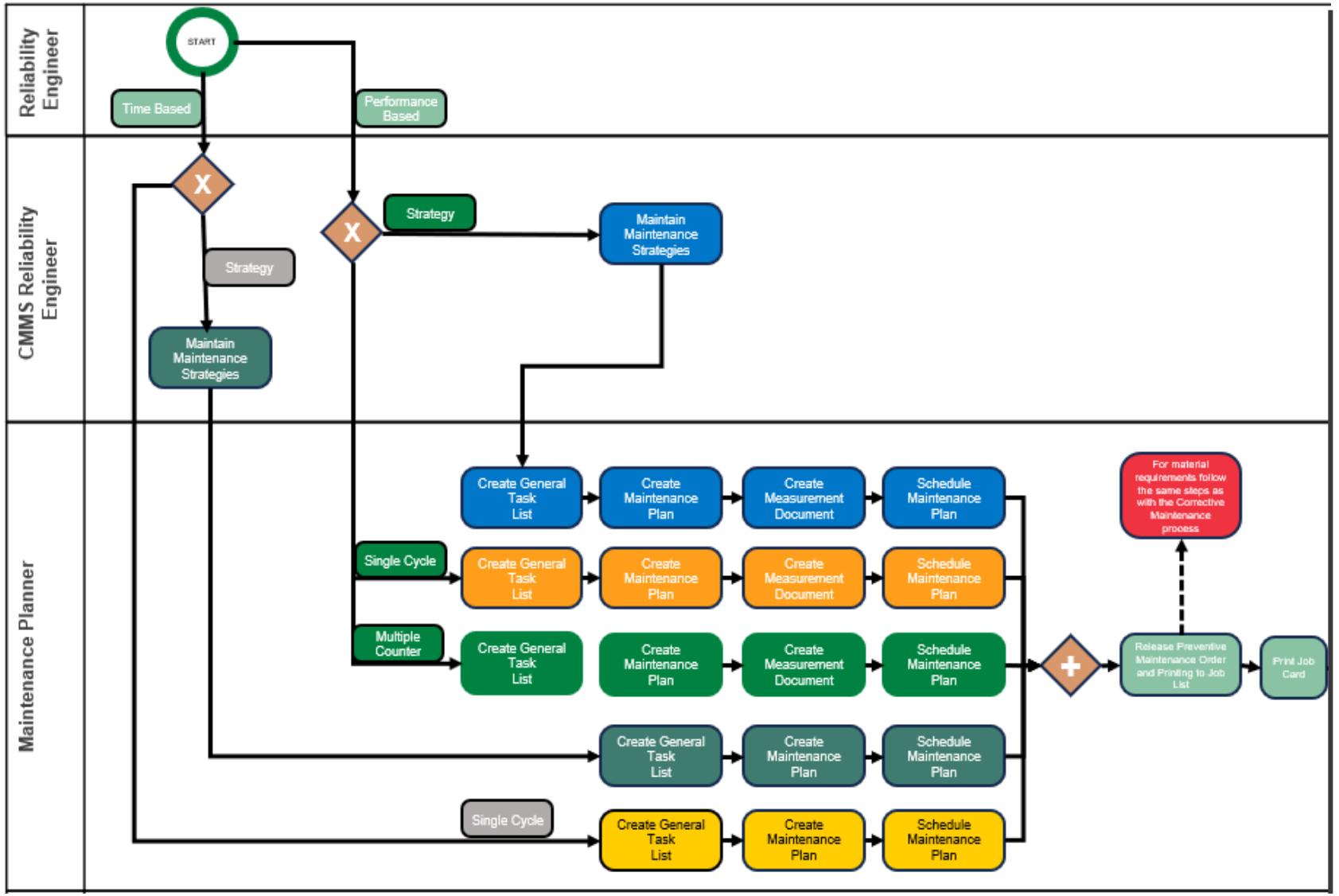
Corrective maintenance (PLT* > 7 days for resources)



* PLT – planning lead time

Preventive maintenance



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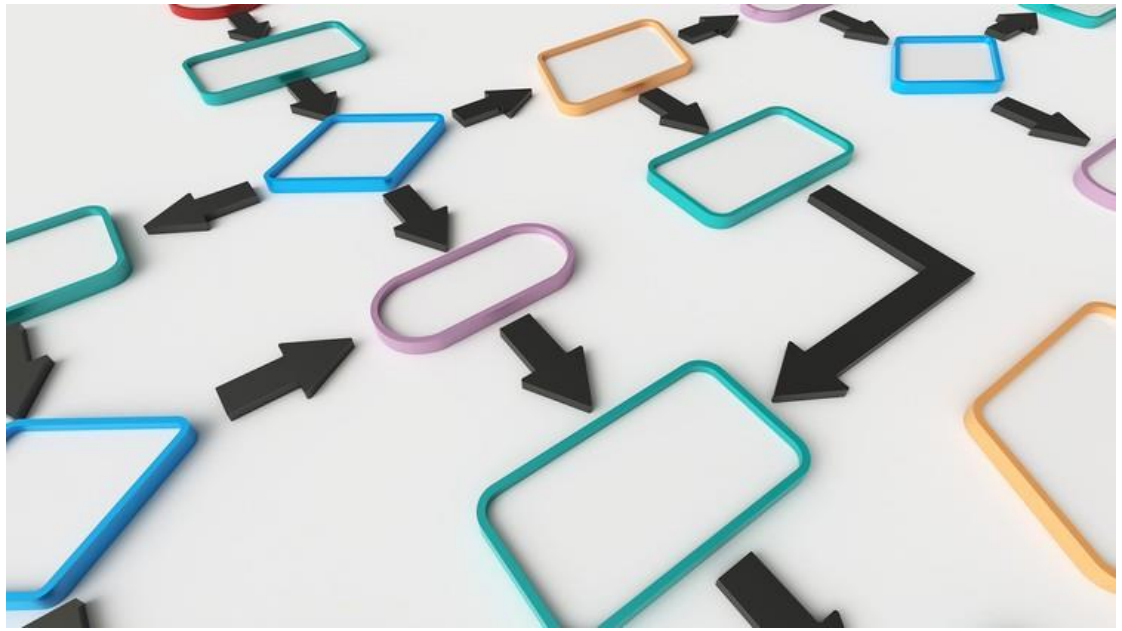
Types of classifications

When deciding which work is the most important, the approved work orders are classified according to criteria.

What are the different types of classifications used in your organisation for sorting work orders?

Reasons for coding work orders



- Codes allow sorting and analysis of maintenance work.
- Codes should support reporting requirements and AM KPIs.
- Codes for typical groupings that can be required:
  - WOs that must be done during a shutdown
  - WOs waiting for approval or execution
  - WOs related to safety or environment
  - WOs for breakdown events

Codes used for work orders

- **A** Work order type
- **B** Work priority codes
- **C** Work order status codes
- **D** Work centres
- **E** Maintenance activity types
- **F** Work order revision number
- **G** Functional location codes
- **H** Failure analysis codes

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A Work order type

Generated	Work order type	Description	Explanation
Manual	PM01	Corrective Maintenance	Non-tactical maintenance, work arising from breakdowns and operator look, listen and feel operations
System	PM02	Preventive Maintenance	Tactical maintenance, time- or performance-based maintenance activities as programmed into SAP
Manual	PM03	Follow-on maintenance	Tactical maintenance, work arising from PM02 (preventive maintenance) inspection or condition monitoring activities
Manual	PM04	Refurbishment maintenance	Also called rotable repairs, the change-out, refurbishment, or restoration of specific equipment types where the cost of repair is significantly less than the residual asset value
Manual	PM05	Project maintenance	CAPEX, Offcrop or abnormal maintenance to restore, repair or upgrade equipment outside of the asset life cycle plan

A Validation and work order route

Urgency code: the urgency code determines the route of the work order through the work management cycle.

The following needs to be considered:

- PM03 (follow-on work orders) and PM04 (refurbishment work orders) are generated by the maintenance planners and follow the maintenance work order cycle.
- PM01 (urgent corrective work orders, PLT<7 days) go straight to work execution; PM01 (non-urgent corrective work orders, PLT>7 days) are resourced by the maintenance planner.
- PM03 (preventive work orders) are created by the Reliability department and programmed into SAP for planning by the planned maintenance planners.
- PM05 (capital maintenance orders) are created by the capital/project management planners for equipment rebuilds or overhauls.

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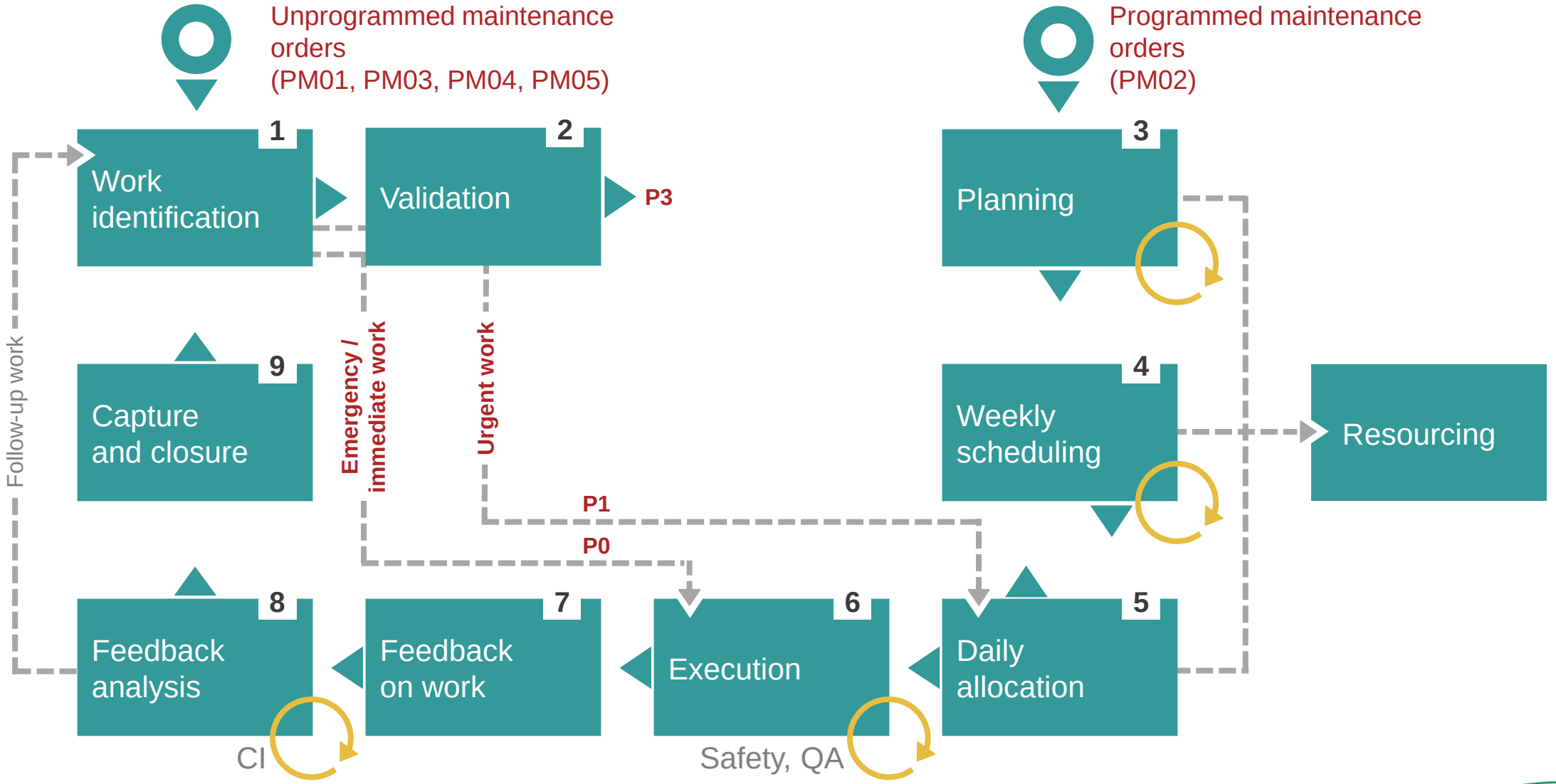
B Work priority codes

Priority	Indicative scheduling	Action
P0	Emergency	Convert notification into work order, plan labour and material, release and complete the work immediately. Includes urgent breakdown work and urgent safety issues. The emergency work order gives the requestor the authority to change the request into an order = spare parts, or suppliers get issued order numbers immediately
P1	Immediate	Convert notification into work order, plan labour and material, release and complete the work immediately. Includes urgent breakdown work and urgent safety issues.
P2	Urgent, within current schedule (PLT<7 days)	Plan labour and material, release and complete the work within the current scheduling period. The maintenance foreman manages the resourcing for the maintenance work directly.
P3	Planned, within next schedule (PLT>7 days)	Plan, schedule and complete work within the next scheduling period. The resources required for the work order have a lead time longer than seven days and are fully planned by the planner.
P3	Programmed, appropriate maintenance period	Includes all programmed work, plans, schedule and complete work at the next maintenance intervention defined by scheduling rules.

B Work priority code application



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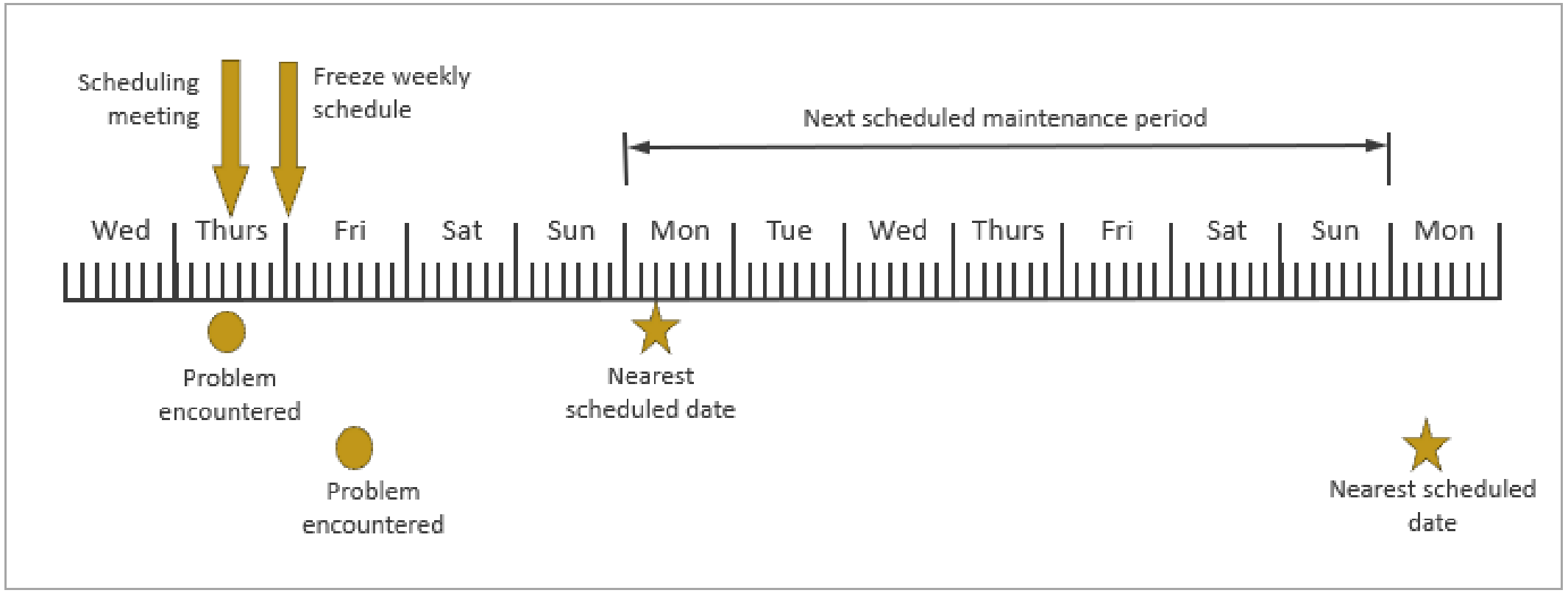
B Scheduling period

The scheduling meeting is midday on Thursday. The weekly schedule is frozen at midnight on Thursday. The next scheduling period could be between four and ten days away. Both work orders have a P3 priority as they are both planned; if the second work order needs to happen in the next scheduling period it must be P2 priority.



B Priorities

Priority codes allow for ranking work orders in order of importance:

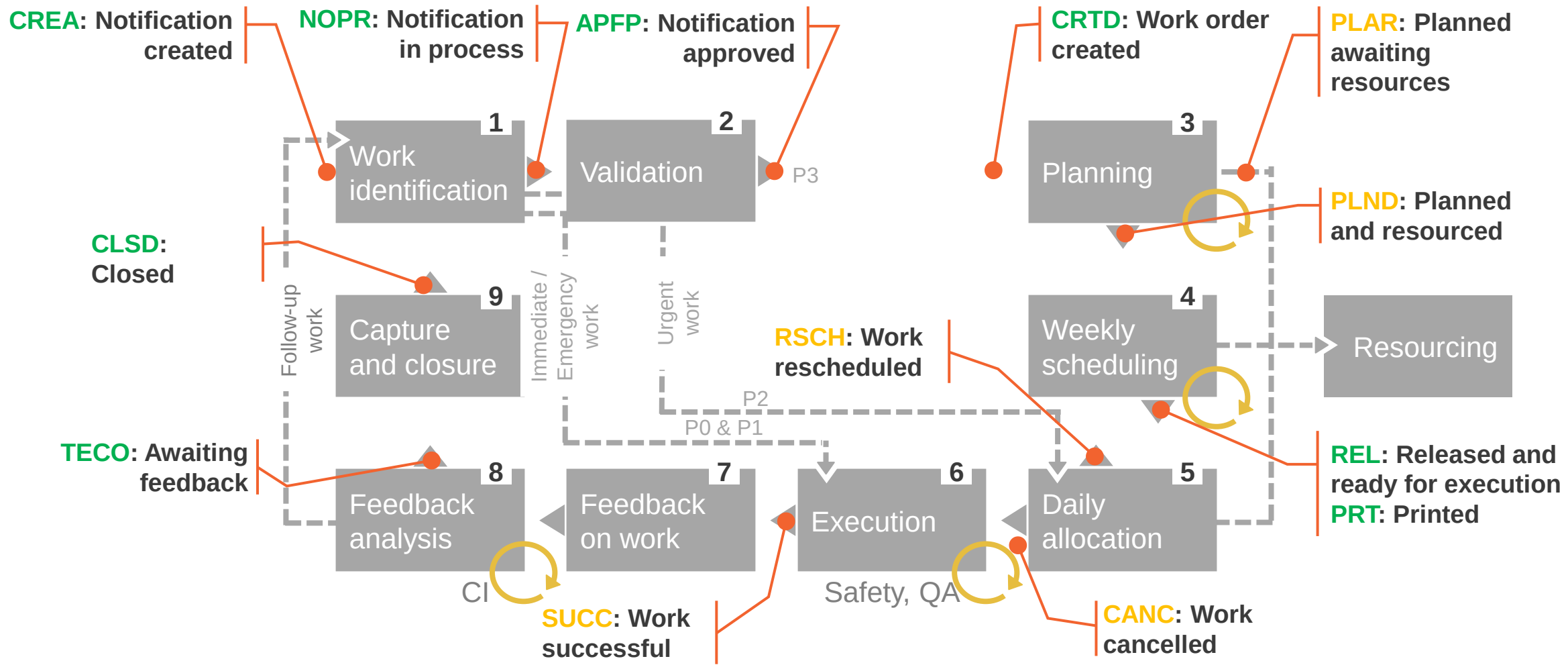
- Important scheduling rule
- Can be a product of urgency, task importance and asset importance

Organisational discipline is crucial to ensure correct usage:

- Education
- Communication
- Management commitment

C Work order status codes

These codes are used within the SAP system to categorise and manage where within the work order cycle the work order currently is. Statuses in **GREEN** are the “Go Live” status in SAP. The statuses in **ORANGE** are future statuses to be implemented.



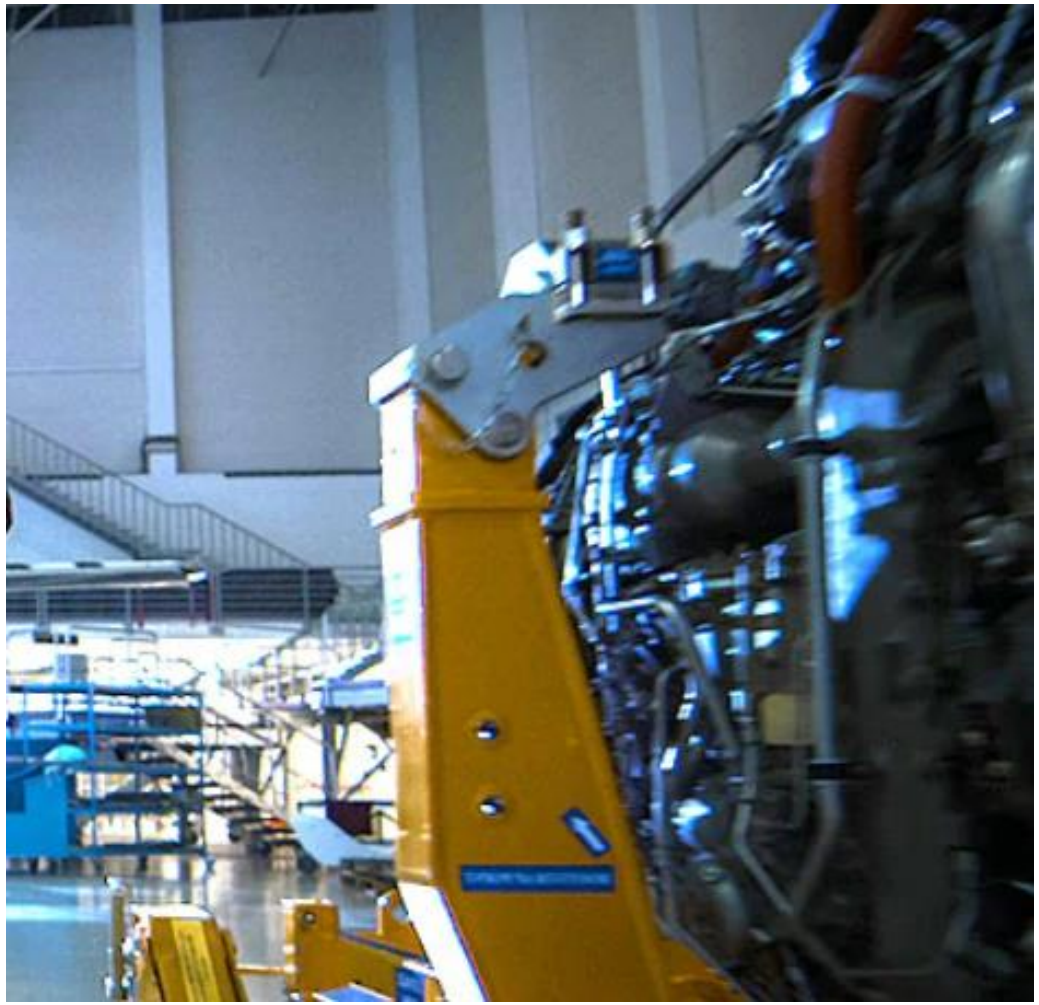
C Work order status codes – indicator key

- When using the SAP system, it is important that stakeholders of maintenance work can view the status of the work.
- It is a very effective communication mechanism whereby the status codes and indicator keys will inform others of the progress of the various work orders in the system.
- No need to contact supervisors or maintainers directly.
- Enables effective tracking of work progress through work metrics and KPIs.

Indicator key	Description
CR	Contractor required
IN	Insurance claim
MD	Master data change
OT	Overtime required
PR	Parts required
RC	RCA required
RW	Rework
RZ	Red zone safety
WA	Warranty active

D Work centres

- These codes make it possible to track who originated the work and who is responsible for executing the work
- Work centres:
  - Main work centre: foreman
  - Resource work centre: maintenance resource
- Backlog and work already performed are easily sorted into work groups such as mechanical and electrical
- Reporting on KPI metrics



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Work order duplication

How do you ensure that there are no duplicate work orders in the system?

E Maintenance activity types

Maintenance activity types allow backlog and completed work to be sorted to determine how the plant is performing.

- Is most of the work tactical or non-tactical?
- How much condition-based work is performed?
- How much follow-up work is initiated through inspections?
- How much breakdown work is performed?
- This information is important if you want to provide a proper asset management service rather than just a repair service.

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E Maintenance activity types

Definitions:

Tactical maintenance: maintenance actions that are planned, programmed and intended to prevent deterioration in the performance of equipment.

Non-tactical maintenance: maintenance actions identified and executed as a consequence of the unexpected equipment condition. These actions can be planned or unplanned.

- The maintenance activity types allow you to define an additional level of detail for your maintenance tasks. This can be for task processing or differentiation in the maintenance history analysis.
- The maintenance activity types are stored in the header of each maintenance order.
- The maintenance activity types are used in the PM information system as a grouping element for maintenance orders and are used to determine the execution work centre in some instances.
- Maintenance activity types are linked to the work order type.
- Maintenance activity types assist in determining whether the work is tactical or non-tactical.

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E Non-tactical maintenance activity types

Non-tactical maintenance activity types must be defined BEFORE work order approval.

Work order type	Maintenance activity type (MAT)	Tactical non-tactical	MAT descriptor
PM01	M01	Non-tactical	Repair: partial failure
	M02	Non-tactical	LTA: plant stopped
	M03	Non-tactical	PIM/EFM: LTA possible
	M04	Non-tactical	Restoration: full overhaul
	M05	Non-tactical	Replacement: parts replacement
	M06	Non-tactical	Calibration: re-calibrate equipment
	M07	Non-tactical	Lubrication: grease / lubricant refill
	M08	Non-tactical	SM: safety of people
	M09	Non-tactical	MM: fabrication / civil maintenance
	M10	Non-tactical	COM: charge out maintenance
	M25	Non-tactical	Root cause analysis
PM04	M01	Non-tactical	Repair: partial failure
	M04	Non-tactical	Restoration: full overhaul
	M04	Non-tactical	Replacement: parts replacement

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E Tactical maintenance activity types

Tactical (PM02) maintenance activity types are defined for the work order when programmed.

Work order type	Maintenance activity type (MAT)	Tactical non-tactical	MAT descriptor
PM02	M04	Tactical	Restoration: full overhaul
	M06	Tactical	Calibration: re-calibrate equipment
	M07	Tactical	Lubrication: grease / lubricant refill
	M11	Tactical	Inspection
	M12	Tactical	Service: parts replacement
	M13	Tactical	SIM: statutory insurance maintenance
	M14	Tactical	OHS: compliance
	M15	Tactical	FSM: food safety
	M16	Tactical	Cleaning
	M17	Tactical	Measurement: CBS / oper.

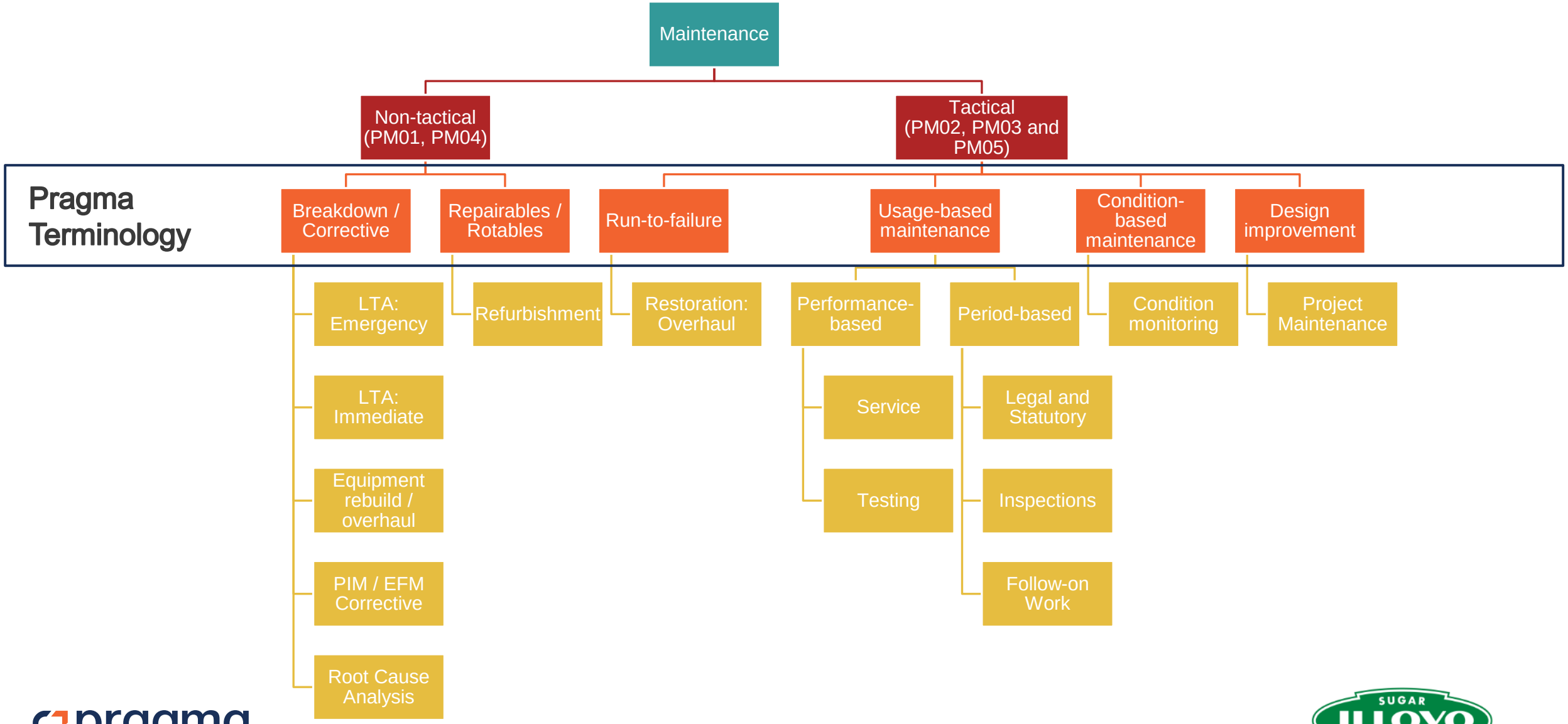
E Manual maintenance activity types

- **Tactical** (PM03 – follow-on maintenance) maintenance activity types must be defined BEFORE work order approval:

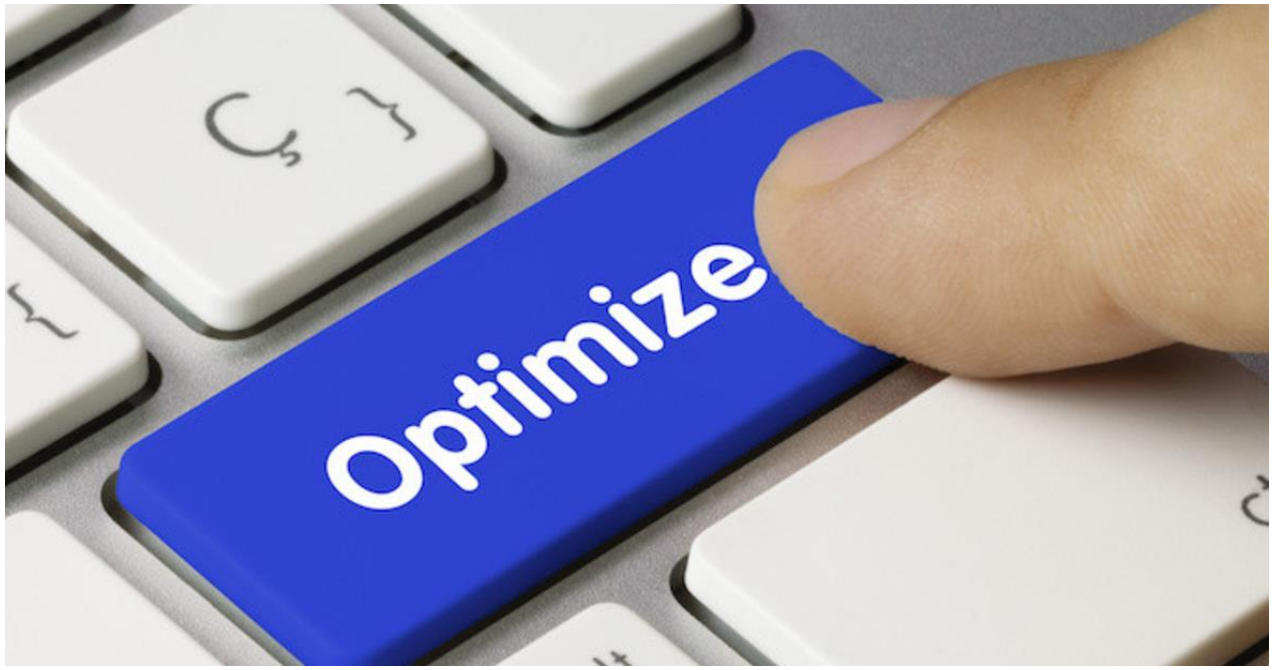
Work order type	Maintenance activity type (MAT)	Tactical non-tactical	MAT descriptor
PM03	M01	Tactical	Repair: partial failure
	M04	Tactical	Restoration: full overhaul
	M05	Tactical	Replacement: parts replacement
	M06	Tactical	Calibration: re-calibrate equipment
	M07	Tactical	Lubrication: grease / lubricant refill
	M18	Tactical	SM: safety of people
	M19	Tactical	MM: fabrication / civil maintenance

- **Offcrop** (PM05) maintenance activity types must be defined BEFORE work order approval unless the maintenance activity type is programmed when configured in SAP.

E Maintenance activity types



F Work order revision number



Planners must understand the requirements for each work order so that maintenance windows may be optimised.

Work order revision numbers are used to group work orders together and can include:

- allocating work to specific scheduling events
- shutdowns or outages
- projects or modifications
- opportunistic windows.

G Functional location

- Data integrity is essential for an effective asset management system
- Allocation of work, work feedback and costs at the appropriate level in the functional location structure at the lowest level available is essential
- Note that assets with repairable spare parts will have lower functional locations than the other assets, and work on the repairable spare parts needs to be captured at this lower level, and the asset class will determine the level of the functional location
- **OBJECTIVE** – to ensure consistency in the application of asset strategies with the functional locations

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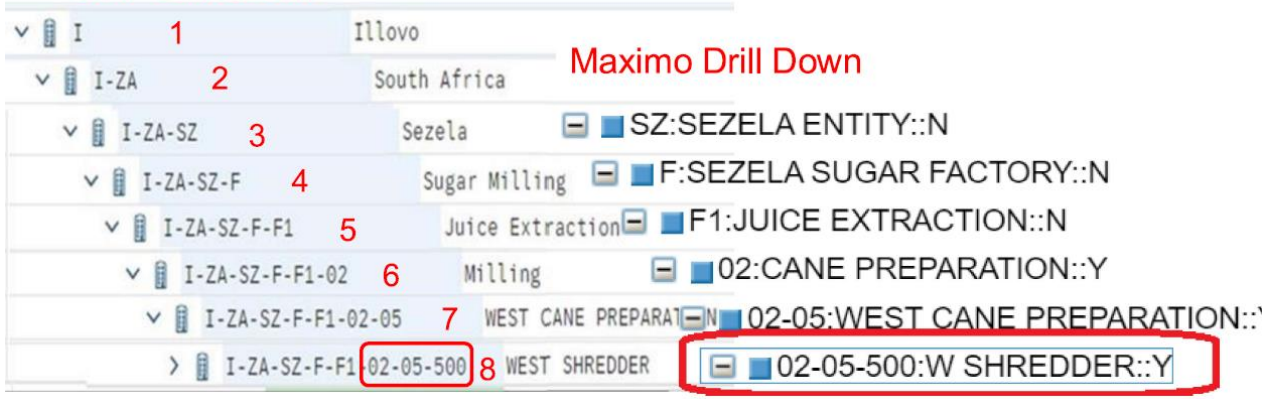
G Functional location

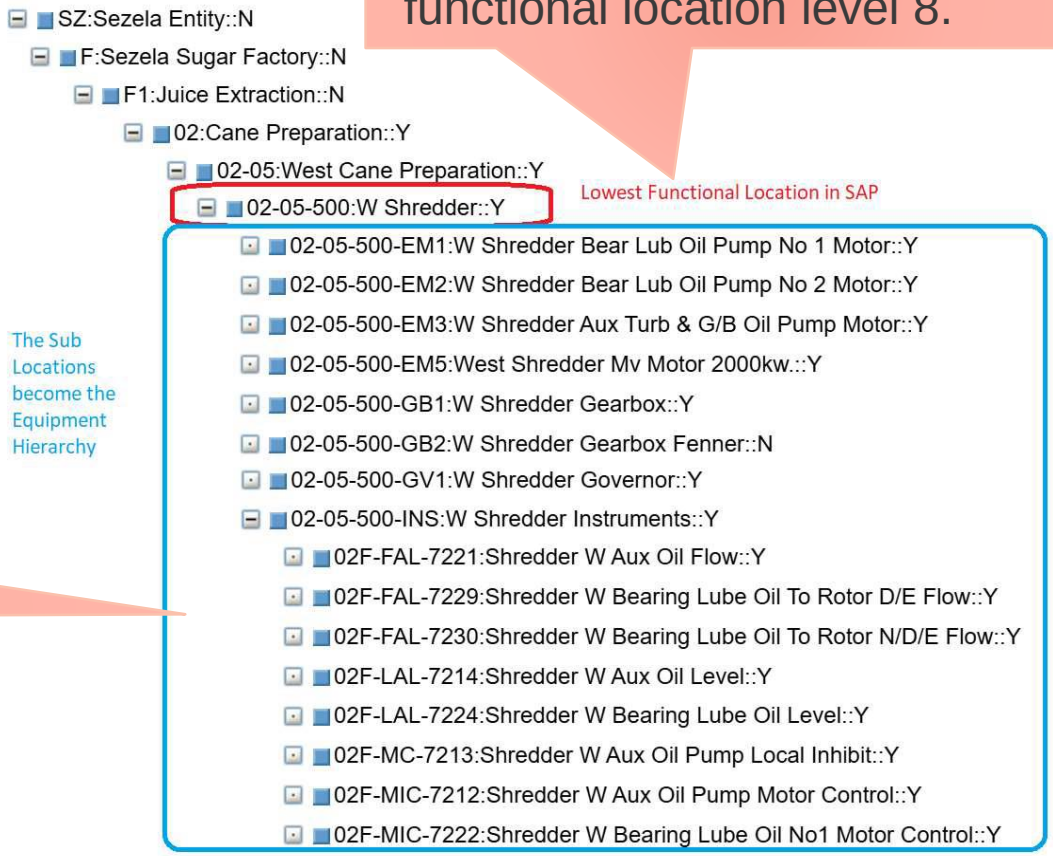
FUNCTIONAL LOCATION HIERARCHY STRUCTURE

SAP Drill Down



Maximo Drill Down

Corrective and follow-on work orders need to be consistently created on equipment records, at functional location level 8.



The Sub Locations become the Equipment Hierarchy

Failure analysis will need to happen on the sub-locations below the equipment record.

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H Failure codes

- Individually (per work order), the completed failure analysis codes have little significance, but by evaluating 100s or 1000s, they provide important trends.
- They provide valuable information to be used during asset care plan development for the accurate completion of an FMEA.
- They are coded and linked to the equipment type to simplify and ease analysis.
- The process is performed for all non-tactical maintenance work.
- It is important that technicians can see that the information is used, otherwise they will not be serious regarding the quality of analysis on the work order.

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H Failure codes

PUx00001	Centrifugal Pump
PUx00002	Multistage centrifugal pump
PUx00003	Vertical spindle Centrifugal
PUx00004	Rotary Vane Vacuum Pump
PUx00005	Submersible Pumps
PUx00006	Rotary Vane Pump
PUx00007	Gear Pump
PUx00008	Diaphragm Pump
PUx00009	Screw Pump
PUx00010	Peristaltic Pump
PUx00011	Lobe Pump
PUx00012	Plunger Pump
PUx00013	Piston pump
PUx00014	Axial Flow Pump
PUx00015	Split casing centrifugal Pump

PU500001	2001 - Abrasive Wear
PU500001	2002 - Component Quality
PU500001	2003 - Contaminated Gland Water
PU500001	2004 - Contaminated Lubricant
PU500001	2005 - Corrosion Protection Failure
PU500001	2006 - Foreign Object
PU500001	2007 - Friction Wear
PU500001	2008 - High Temperature
PU500001	2009 - Inadequate Gland Water
PU500001	2010 - Inadequate Lubrication
PU500001	2011 - Incorrect Adjustment
PU500001	2012 - Incorrect Assembly
PU500001	2013 - Incorrect Component Fitted
PU500001	2014 - Incorrect Lubrication
PU500001	2015 - Incorrect Operation

PUA00001	3001 - Adjusted
PUA00001	3002 - Calibrated
PUA00001	3003 - Discarded
PUA00001	3004 - Inspected
PUA00001	3005 - Isolated
PUA00001	3006 - Measured
PUA00001	3007 - Realigned
PUA00001	3008 - Recharged
PUA00001	3009 - Refilled
PUA00001	3010 - Replaced
PUA00001	3011 - Reset
PUA00001	3012 - Restored
PUA00001	3013 - Rework
PUA00001	3014 - Serviced
PUA00001	3015 - Tested

PUB00001	0009 - Adjustment Bolt
PUB00001	0059 - Balance Disc
PUB00001	0082 - Bearing
PUB00001	0084 - Bearing Assembly
PUB00001	0220 - Casing Bolt
PUB00001	0389 - Diffuser
PUB00001	0479 - End Liner
PUB00001	0726 - Impeller
PUB00001	0836 - Mechanical Seal
PUB00001	0908 - Packing
PUB00001	0959 - Plunger
PUB00001	0999 - Pump Casing
PUB00001	1040 - Relief Valve
PUB00001	1123 - Screw
PUB00001	1133 - Seal

PUC00001	1001 - Bent
PUC00001	1002 - Binding Or Jamming
PUC00001	1003 - Broken
PUC00001	1004 - Chaffed
PUC00001	1005 - Contaminated
PUC00001	1006 - Corroded
PUC00001	1007 - Cracked Or Fractured
PUC00001	1008 - Distorted
PUC00001	1009 - Fails To Close
PUC00001	1010 - Fails To Open
PUC00001	1011 - Loose
PUC00001	1012 - Out Of Tolerance (Drift)
PUC00001	1013 - Overheated
PUC00001	1014 - Pitted
PUC00001	1015 - Scored

PU200001	Centrifugal Pump-5Why&Tasks
PU500001	Centrifugal Pump-FailCause
PUA00001	Centrifugal Pump-Activity
PUB00001	Centrifugal Pump-Object Part
PUC00001	Centrifugal Pump-FailMode
PUD00001	Centrifugal Pump-Fixed Priority

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H Equipment codes and categories

Equipment codes are used to uniquely identify individual equipment items within the operation.

Equipment codes are used to track the work and cost history on the equipment, particularly where the equipment is a rotable asset.

Equipment is grouped into equipment categories for reliability analysis purposes and to facilitate the optimising of maintenance tactics across “families” of equipment types, where applicable.

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Assign the correct codes

A Urgency codes

B Priorities

C Status codes

D Work groups, functional locations, work centre

E Tactical work codes

F Planning codes

G Event codes

H Asset codes, asset type codes or Equipment categorie_

tion

Join your breakout room as per the allocated groups. Engage with the scenario given to your group as follows:

- Group 1 Scenario 1 and 2
- Group 2 Scenario 1 and 2
- Group 3 Scenario 3 and 4
- Group 4 Scenario 3 and 4

Assign the appropriate codes and share your feedback with the rest of the class.

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Coding Scenario 1 and 2

- The engineering manager's air-conditioner in his/her office is broken. He/she phones the on-site electrical maintenance supervisor to sort out the problem.
- The GM performs a visual walkabout and spots a leaking hydraulic control valve. He/she asks the production engineer to rectify the situation before the head office's visit next week.
- The maintenance planner receives feedback from a tactical inspection that FOL is needed.

Urgency	Indicative Scheduling	Criteria
1	Immediate	Immediate maintenance work required due to significant failure of production equipment or significant safety risk
2	With current scheduling period	Urgent maintenance work required to maintain production function Next scheduling period too far away
3	Next scheduling period	Maintenance work required on production related equipment Ideally performed in next maintenance period
4	Within next 2 scheduling periods	Maintenance work required on production or non-production related equipment Ideally performed within next 2 maintenance periods
5	Appropriate scheduling period	General maintenance request Apply scheduling rules to determine when the work will be conducted

- The maintenance supervisor plans a task that requires the replacement of a component of a critical piece of production equipment that failed during the night.
- An operator requests the repair of an electrical motor that is making a terrible noise.
- After numerous problems with a Warman positive displacement pump, the plant engineer actions the replacement of the pump with a new-specification mono-pump.

Type of work	Code	Tactical / Non-tactical	Definition
General Maintenance (Ad hoc)	ADH	Non-tactical	Ad hoc work is a non-production related activity that is identified through unplanned observation and cannot be categorised as any of the other non-tactical types of work. Ad hoc is also known as general maintenance.
Deferable Maintenance (Reactive)	REA	Non-tactical	Reactive work is a production related activity that is non-urgent, deferrable and required to recover full operational productivity based on an obvious, unanticipated threat of equipment failure.
Breakdown	BRE	Non-tactical	Breakdown work is a production related activity that is urgent and required to recover full operational productivity after an unplanned loss of function.
Repair	REP	Tactical	Repair work is one or more tasks that are used to implement a run-to-failure maintenance tactic. Usually with RTF the failure is evident.
Usage-based	UBM	Tactical	Usage-based work is one or more tasks with a UBM tactic, which are normally in the form of services and/or replacements. There are two types of usage-based tasks: calendar-based and meter-based.
Condition monitoring	CON	Tactical	Condition monitoring work is one or more tasks that are used to implement a condition-based maintenance tactic, normally in the form of inspecting or testing certain characteristics.
Follow-up	FOL	Tactical	Follow-up characterises the type of work of corrective follow-up (work arising) maintenance task(s), originating from anomalies identified from failure finding tasks.
Project and modification	PRO	Tactical	Project and modification work is one or more tasks that are used to implement a design improvement maintenance tactic on an asset; normally in the form of an addition, removal or change to an asset or part thereof to improve reliability or throughput.

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Coding Scenario 3 and 4

- A maintenance tradesperson notices an exposed hydraulic piston starting to rust in the maintenance store. He/she asks the supervisor to address the problem.
- The maintenance engineer heard in an asset management course that the shafts of electric motors in the stores should be turned 4¼ turns every two weeks. He/she would like to set an example and creates a work order within the EAM system to control this activity.
- A critical hydraulic control valve failed and the whole hydraulic control room is flooded with the hydraulic fluid from one of the main compensator cylinders.
- A duty pump failed in recovery and the standby pump kicked in automatically. The operator realised that the duty pump had failed when he/she completed the checklist at the beginning of the shift.
- An electrical motor is re-wound in the electrical store by a specialist contractor.

Urgency	Indicative Scheduling	Criteria
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Reflect on the learning objectives of this module

Are you able to:

- differentiate between the different sources of maintenance work
- explain the requirements and controls to achieve quality within the work identification process
- differentiate between the different outputs of the work validation process
- explain the purpose and factors which influence the validation process
- distinguish between immediate, urgent and planned work and the impact on the schedule
- identify, describe and assign appropriate codes when validating work?

A. Yes

B. No

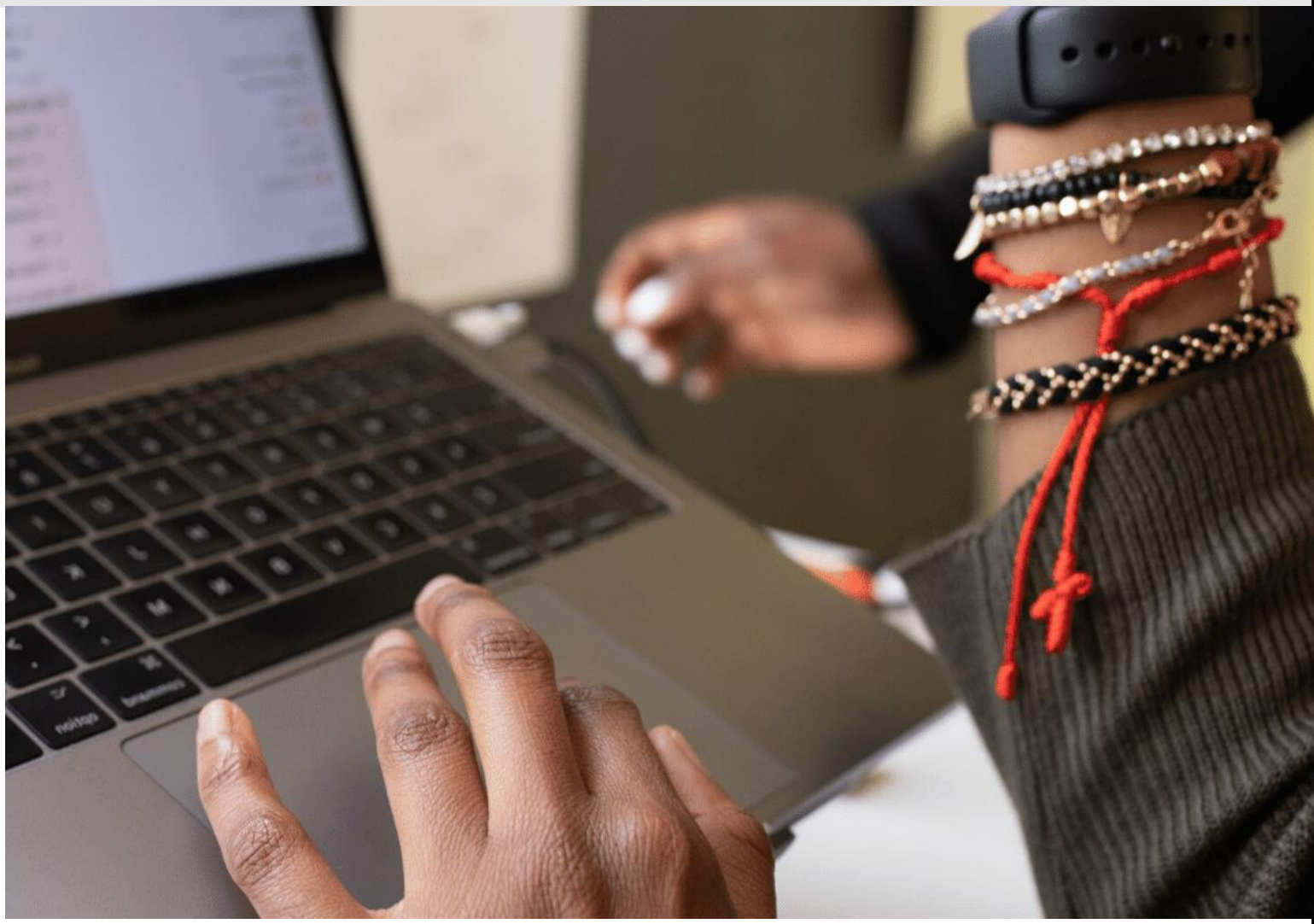
C. Partially

Module 04: Planning and Scheduling Process

Maintenance Work Management

Rules of engagement in the VILT environment

1. Mute yourself when you are not speaking.
2. Close your email and any other distractions on your desktop and mute your phone notifications.
3. Let us know if you step away from the session – just type us a note into the chat.
4. Participate and be prepared to be called upon by name to give a response.
5. Speak up, use the chat, or raise your hand when you have a question or comment.
6. Use annotations when instructed to do so.



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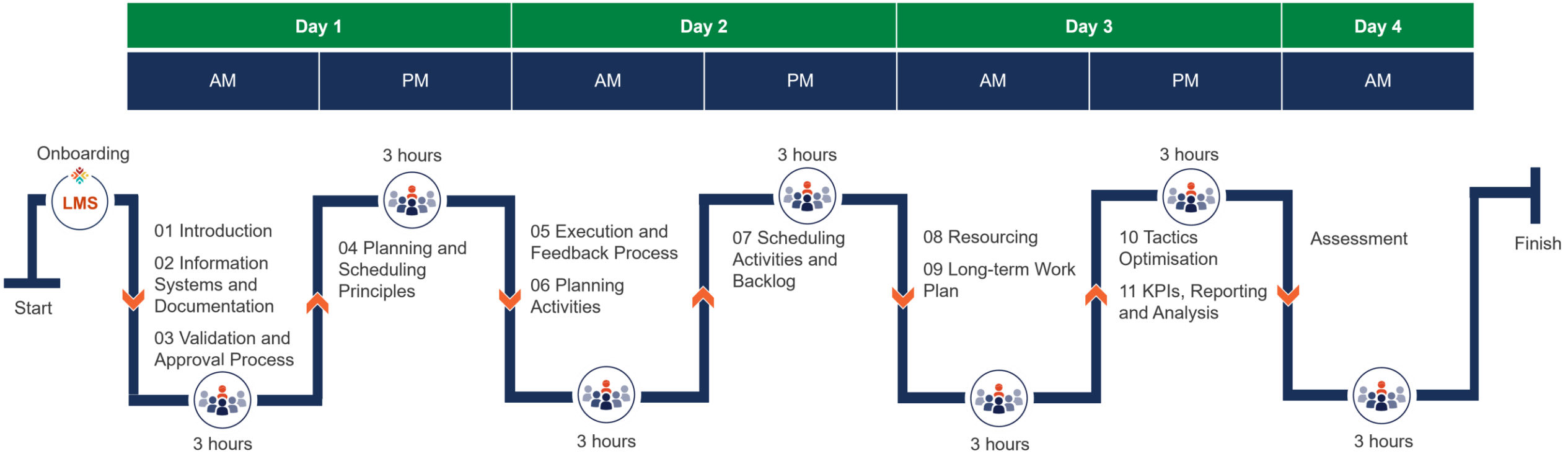
Illovo MWM learning journey



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Schedule for this session – Day 1

Time	Content to be covered
15 minutes	**Welcome**
30 minutes	**Module 01: Introduction to Maintenance Work Management**
10 minutes	**Leg stretch**
60 minutes	**Module 02: Maintenance Work Management: Information Systems and Documentation**
75 minutes	**Module 03: Validation and Approval Process**
	Lunch
180 minutes	**Module 04: Planning and Scheduling Process: Scheduling**

pragma

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Ice-breaker

Thinking about the skill-set that a good planner should have, what would you say is your strongest skill that helps you in your job?

A. I can communicate very well.

B. I am very good at resolving conflict.

C. I am a very good facilitator.

D. I can negotiate well and always get to a win-win situation.

Learning objectives for this module

After completing this module you will be able to:

- explain the critical objectives of maintenance planning
- describe the benefits to the organisation if planning is done efficiently and effectively
- explain the six strategies for maintenance planners to achieve the objectives of planning
- recognise and distinguish between good and bad practices within planning and suggest improvements based on the strategies
- describe the benefits to the organisation if scheduling is done efficiently and effectively
- explain the six strategies of scheduling to achieve efficiency and effectiveness
- recognise and distinguish between good and bad practices within scheduling and suggest improvements based on the strategies.

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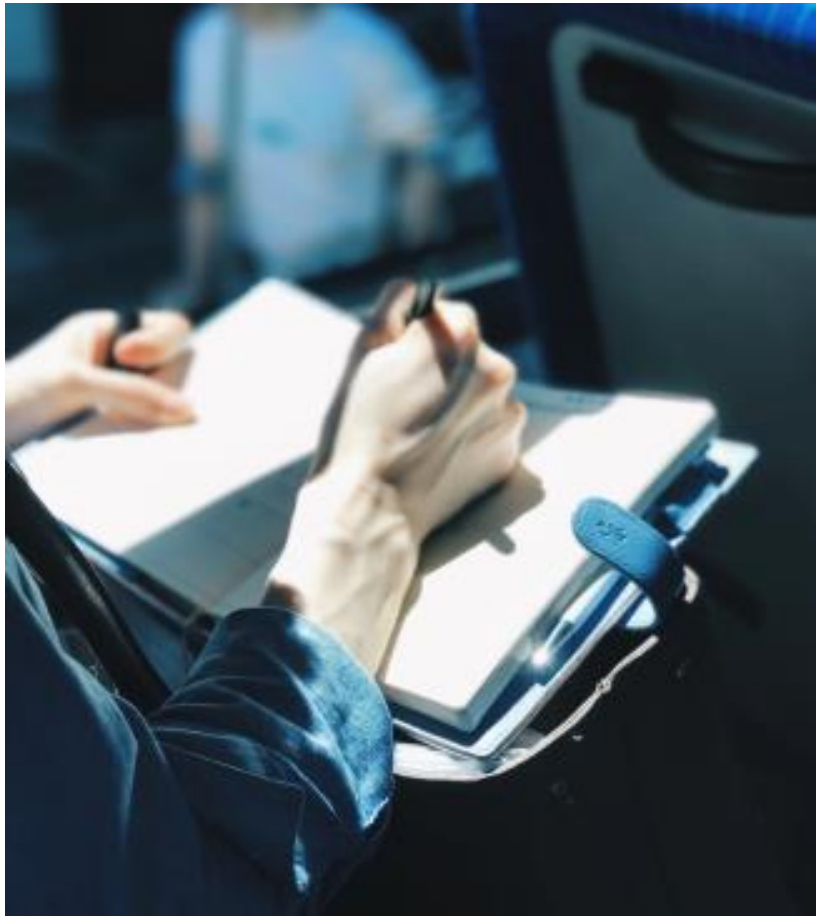
Work to be scheduled



What is the difference between planning and scheduling?

Type your answer using the public chat feature.

Planning

Good planners

Think about the job of a planner and what they have to do. What is your guiding principle when you perform your work?

Type your answer to the question using the public chat feature.

The critical objectives of maintenance planning

Which **one** of these elements do you think is the most critical for being **efficient** and **effective**?

Right tools

Right time

Right place

Right duration

Right quality

Right cost

Right work

Right way

pragma

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What is the purpose of maintenance planning?

The **purpose of maintenance planning** is to ensure the right work gets done, at the right place and time, in the right way, with the right tools, materials and people. All with minimal waste.

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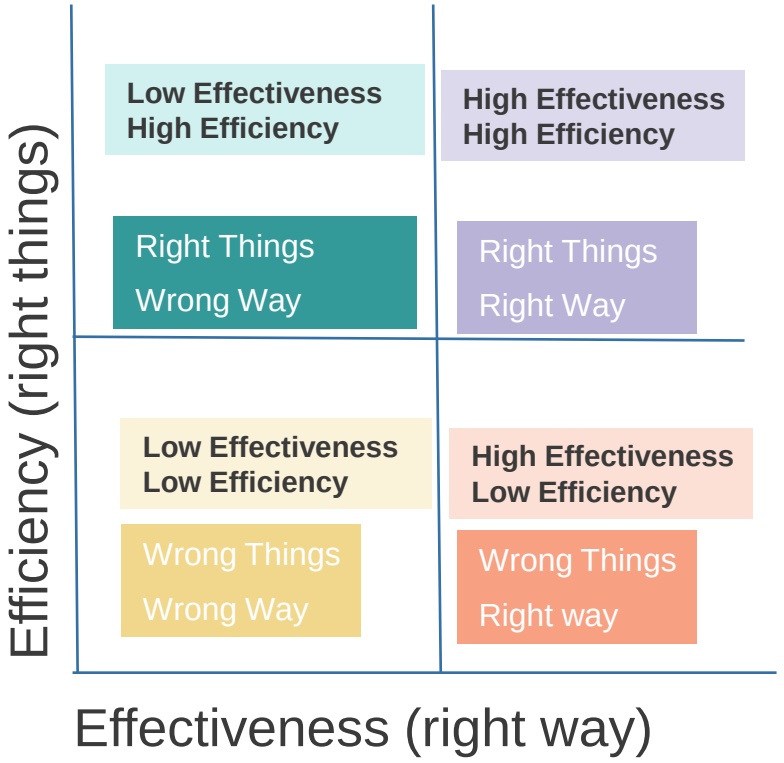
What can we achieve with maintenance planning?

High effectiveness and high efficiency

Good planning
improves
*wrench time
by 45-50%



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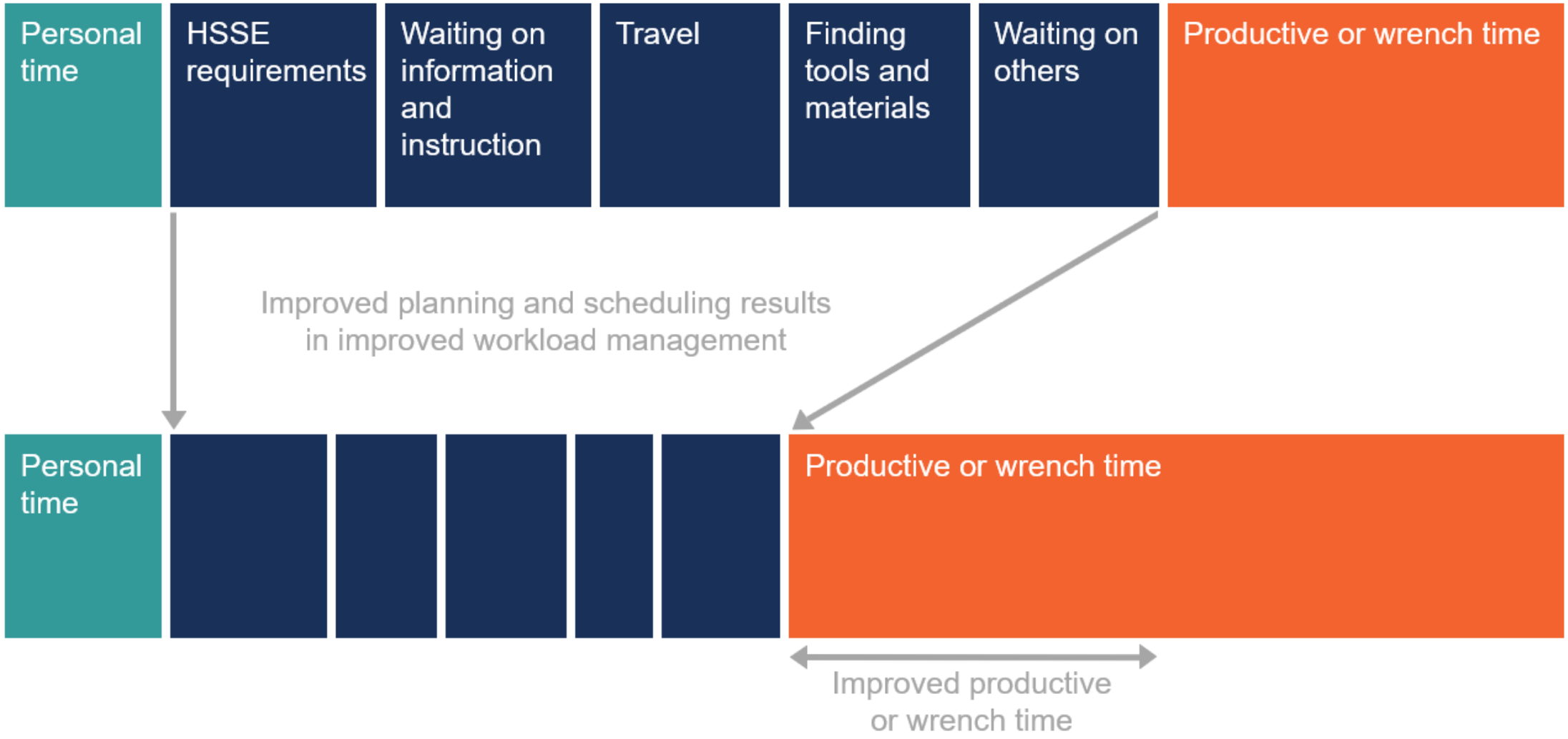
The value of a competent maintenance planner



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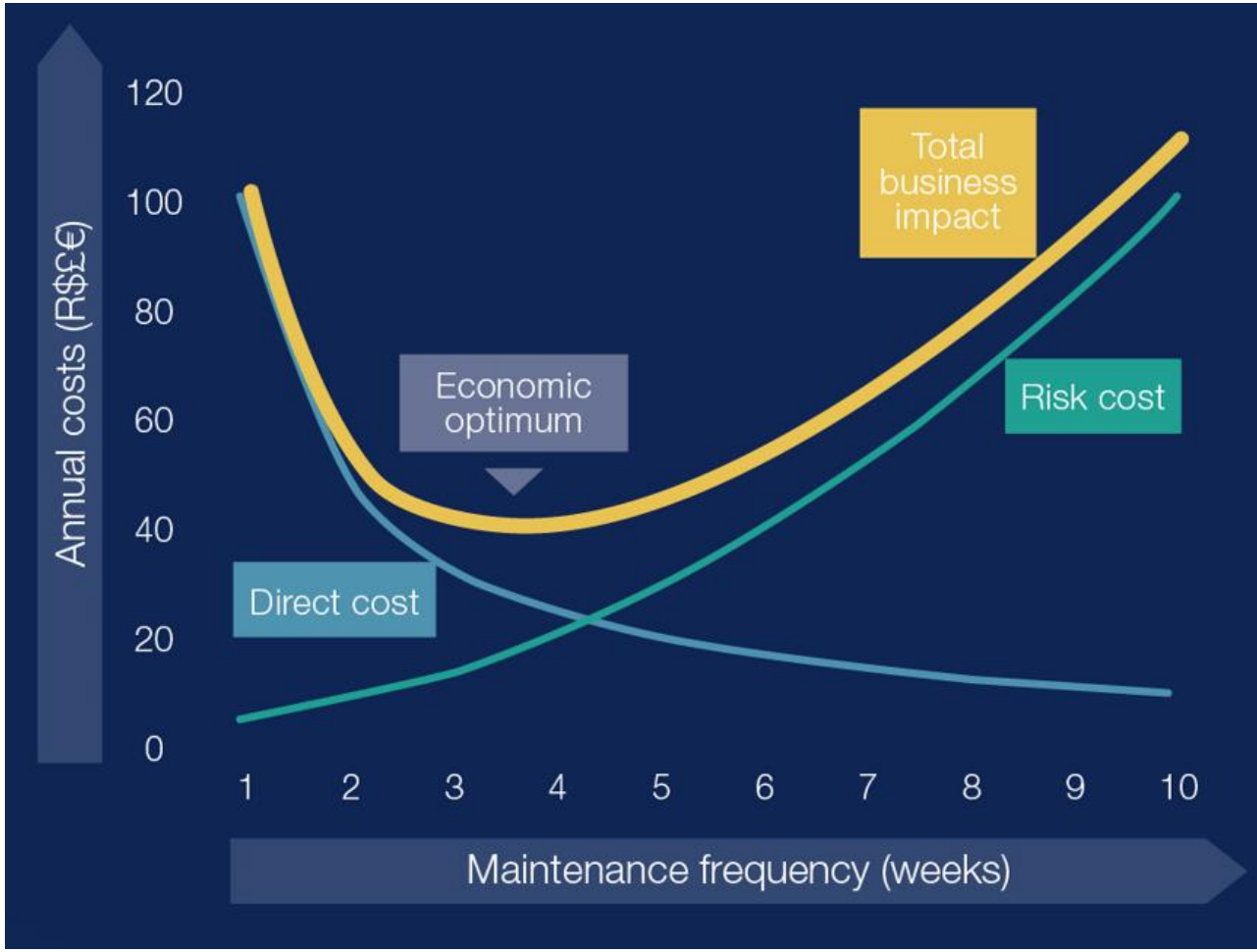
The value of a competent maintenance planner



Cost and risk

Getting the balance right between asset economic exploitation and asset care. Asset care centric organisations benefit from deferred capital investment.

Delivery and risk

Delivering sustainable asset reliability, through optimised resource utilisation.
Fun fact: One planner can optimise the efficiency of up to twenty tradespeople.*

Quality

Optimised work instructions, tools and spare parts correctly identified enables a more readily available workforce to be optimised for more complex jobs and root cause failure analysis.

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The benefits of good planning

Tradesperson productivity

Reduction of delays. Improves tradesperson productivity by 45-50%, boosting a 90-person workforce to 141.

Quality of work

Effective planning ensures that tradespeople are doing the right work, thereby improving asset health and availability.

Shift to proactive work

Increased attention to preventive and predictive maintenance.

Improved efficiency

A sustained shift toward preventive and predictive maintenance ensures better asset availability.

Good planning
improves
*wrench time
by 45-50%

*wrench time = the time that tradespeople spend working with their tools

pragma

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What is the value of planning?

Let us say we have 30 tradespeople…

If you manage to **increase** the wrench time (productive time) of these 30 resources to a whopping…

55

percent

they will now be able to perform the work of a team of

47

people

Available resources

17

resources

You can see that because wrench time is typically so low, even small improvements to the work productivity by planning better can have a huge effect.

pragma

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How do we achieve effective and efficient planning?

- Properly scope the work to be done.
- Correctly identify the trade skill required.
- Accurately estimate the execution time.
- Effectively outline task procedures.
- Appropriately identify spare parts or special tools.

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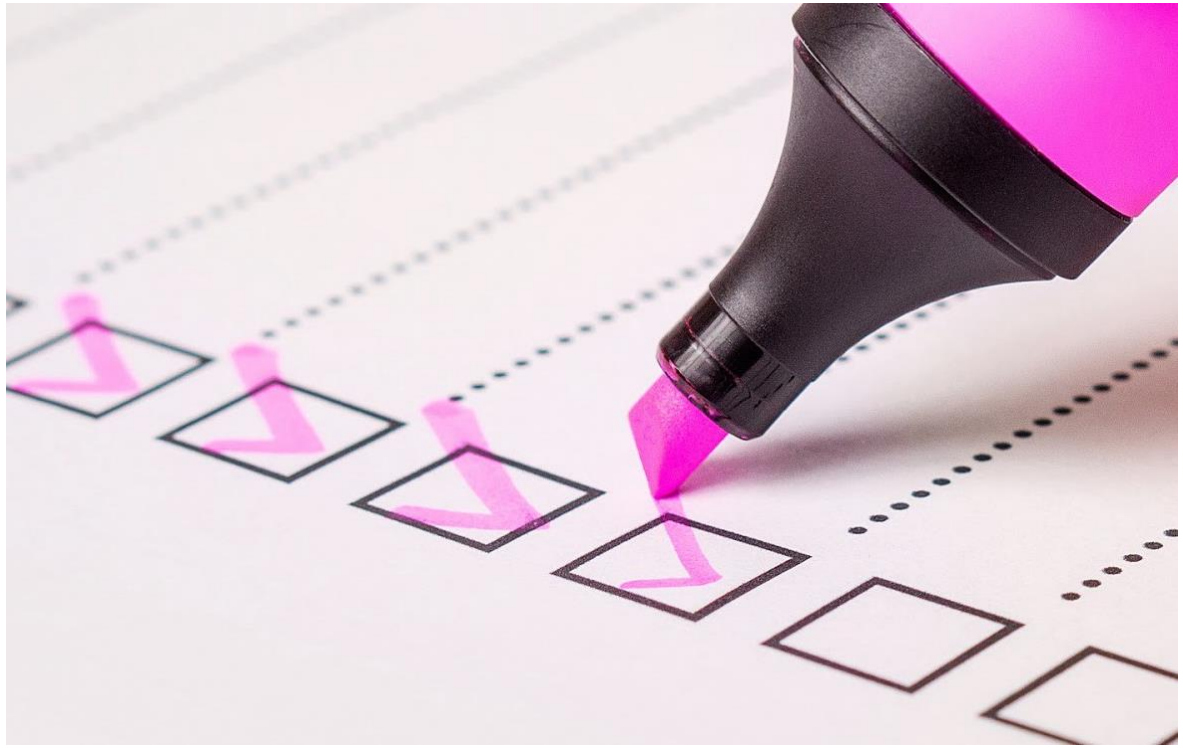
Reflect on the tasks of the planner



Join your breakout rooms and discuss the following questions. Prepare to give feedback to the rest of the class.

Group 1 and 2: What can be done to ensure that the work is accurately and appropriately scoped? How can you ensure that the correct trade skill is identified?

Group 3 and 4: How can we ensure the accuracy of the planned execution time for work orders? How can we ensure that the task procedures are effectively outlined?

pragma

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The six strategies for maintenance planners

Separate departments for planners

The planners are organised into a separate department from the Maintenance department (supervisors and tradespeople). Do you think this is a good idea?

A. Yes

B. No

Separate departments for planners

What is the benefit of keeping the planners in a separate department?

Type your answer using the public chat feature.

pragma

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Separate department for planners

Separate departments

Planners are organised into a separate department from the Maintenance department (supervisors and tradespeople) to facilitate specialising in planning techniques, while focusing on future work.

pragma

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Separate departments for planners

Separate departments

- Maintenance managers will be placed under pressure for “taking some of the best technicians to fill planning positions” – remember that a good planner can bring improved performance to the value of 17 technicians.
- Prevent the planner from being drawn into work execution.
- Planners should become specialists in planning techniques.
- Planners must focus on planning future work.

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Focus on future work

How often are planners involved with work that has already started at your site?

A. Never

B. Sometimes

C. Often

D. Hardly ever

Focus on future work

Focus on future work

The Planning department concentrates on future work – work that has not yet been started. This will ensure that the Maintenance department has at least one week of backlog* work that is planned, approved and ready to execute.

*The definition of **backlog** used by Doc Palmer and used here refers to work planned, approved and with the required resources available.

pragma

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Focus on future work

Focus on future work

If planners are drawn into work that is already underway, a vicious cycle starts, with no work being planned properly. Tradespeople must find their own information or aids once work starts and give feedback to the planner to ensure better planning in the future.

Three key assumptions are needed:

- Planners are willing and available to review feedback to plan future work.
- Feedback is obtained and kept after each work order.
- Equipment is worked on repetitively.

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Maintain information

In many organisations the work orders from the tradespeople are captured into the system by administrators.

How do you as planners get to review the feedback from the Maintenance teams on the work that you have planned?

Type your answer using the public chat feature.

Maintain information

Maintain information in the EAMS

The Planning department maintains asset data and maintenance history. This information is essential for continuous improvement within the maintenance function.

pragma

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Maintain information

Maintain information in the EAMS

Proper information management is essential for maintenance planning and continuous improvement.

Organisations make huge investments in enterprise asset management (EAM) systems to ensure that the information is maintained.

The planning function must maintain the information in a suitable format to ensure that engineers, supervisors and tradespeople can access the information when required.

All information should be arranged by asset number and these numbers should appear on the asset itself.

pragma

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Planners administer estimates

Which of the following do you think has the biggest influence on the decisions made by planners?

A. Maintenance history of the equipment
B. Personal experience
C. Information from supervisors
D. Skills of the existing workforce

Planners administer estimates

Administer estimates (updates)

Planners use personal experience, maintenance history and information from supervisors to develop work plans to avoid anticipated work delays and quality or safety problems.

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Planners administer estimates

Administer estimates (updates)

The objective in planning is to help boost labour productivity, not create perfect time estimates or meet standards.

The planner’s estimates (based on experience, history or the supervisor’s advice) are therefore considered the plant’s standard for work orders, even though they are not engineering standards.

If planning is required outside of the experience of the planner, experts must be consulted.

pragma

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Planners administer estimates

Administer estimates (updates)

Organisations should choose planners from amongst its best tradespeople or supervisors. Planners should rely on personal skills, experience and maintenance history.

Using inexperienced tradespeople or administrators as planners leads to two problems:

- Cannot scope work orders properly.
- Experienced tradespeople on the floor will not respect the quality of the plans and they will doubt Management's seriousness regarding their commitment to planned maintenance work.

pragma

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Recognise the skills of the trade

What are the benefits of using tradespeople or supervisors as planners? Are there disadvantages?

Type your answer using the public chat feature.

Recognise the skills of the trade

Recognise the skills of the trade

The Planning department recognises the skills of the trade. The planner's responsibility focuses on the **what** and the tradesperson's responsibility focuses on the **how**.

pragma

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Recognise the skills of the trade

Recognise the skills of the trade

Tradespeople and technicians follow work plans closely.

Planners have all the necessary information available when developing the work plans.

If tradespeople and technicians follow work plans, reliable history can be collected.

Ownership rests with the planner.

pragma

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Skills required by planners

Recognise the skills of the trade

Planners need **practical** skills. Planners normally retain practical knowledge of trade due to their close involvement throughout the planning process.

Planners need **planning** skills:

- Numerous courses are available to train planners in planning techniques.
- On-the-job training provides the most effective training of planners.
- Keeping planners together in a separate group facilitates this learning further.

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Qualified engineers or supervisors

Recognise the skills of the trade

Supervisors often make the best planners:

- They are typically experienced, top-level tradespeople.
- They normally have a high degree of self-initiative.

Qualified engineers are often not suitable to do the job of a planner:

- Cannot scope work orders properly because they do not have the know-how or experience.
- They are not a cost-effective solution.

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Recognise the skills of the trade

Recognise the skills of the trade

Planners count on the workforce being sufficiently skilled so that they can get all the work planned through placing a minimum level of detail into work order plans – in this instance, some work does not have to be planned at all.

Planners do not have time to develop detailed work order plans for every work request.

Tradespeople and technicians must still adhere to set standards.

Ownership rests with tradespeople, technicians and the supervisors – the preferred option.

pragma

SUGAR ILLOVO AFRICA

Measure performance

What do you think will have the biggest impact on the performance of the Maintenance department?

A. Delays during work orders

B. Delays between work orders

Measure performance

Measure performance

Wrench time is the primary measure of workforce efficiency and of planning and scheduling effectiveness. Work that is planned before assignment reduces unnecessary delays during work orders and work that is scheduled reduces delays between work orders.

pragma

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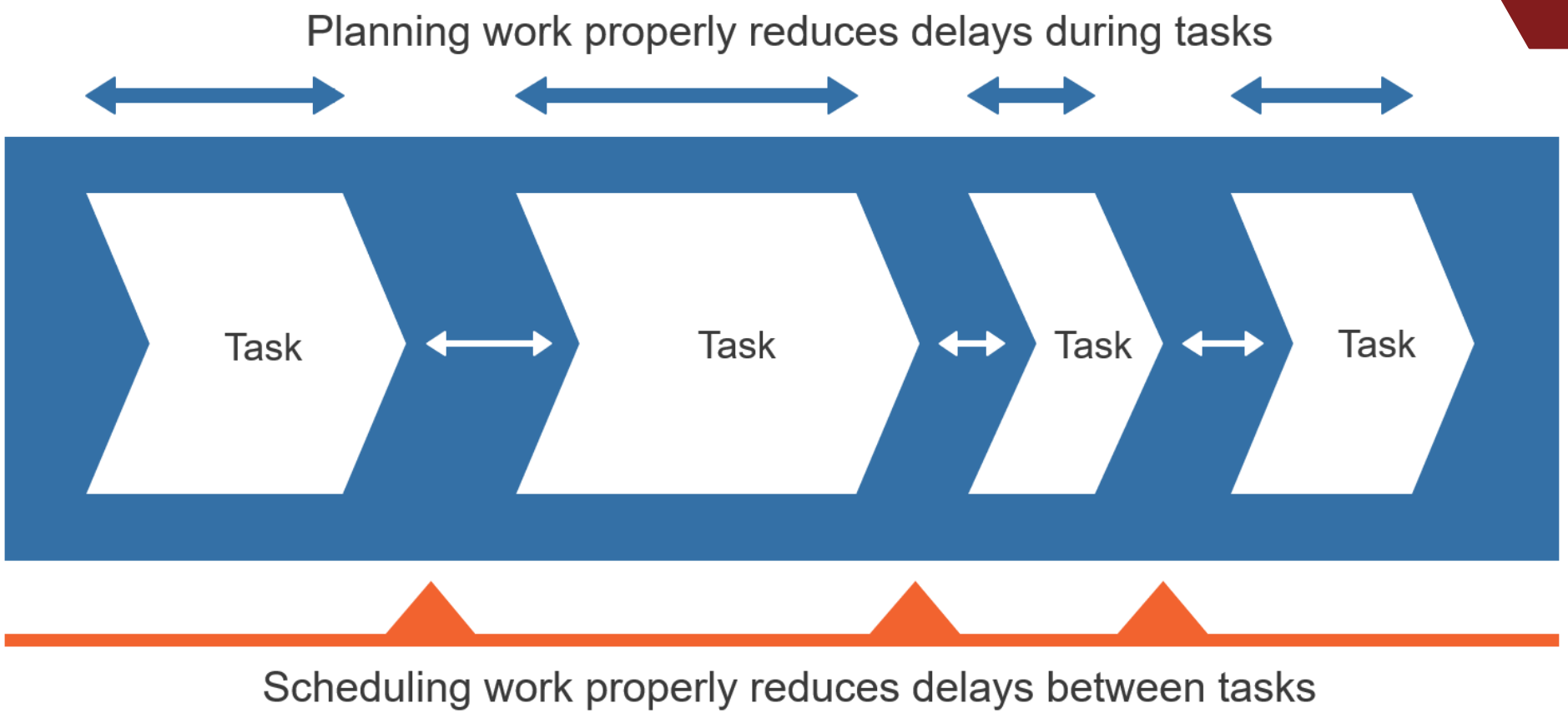
Measure performance

Measure performance



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Measure performance

Measure performance

Work sampling (wrench time) gives us an idea of how much planning helps in improving labour productivity – it does not measure tradesperson or technician performance.

It is important to know what percentage of time is spent working on assets (productive time). It is more important to analyse the non-productive time (obtaining parts, instructions, tools, travel time, etc).

Measuring the wrench time over a few months indicates whether planning is improving.

pragma

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Measure performance

Measure performance

- Typical wrench time benchmarks (25%-35%)
- 600-minute shift
- 30 minutes to get going in the morning
- 45 minutes receiving instructions
- 60 minutes waiting for spare parts or tools
- 45 minutes spent travelling
- 90 minutes on breaks
- 30 minutes extra on lunch
- 90 minutes showering and getting ready to go home
- 210 minutes' productive time = ±35% wrench time

pragma

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Planning principle improvements

Join your breakout room as per the allocated groups. Engage with the scenarios given to your group as follows:

- Group 1 Scenario 1 and 2
- Group 2 Scenario 3 and 5
- Group 3 Scenario 1 and 2
- Group 4 Scenario 3 and 5

Read the **six planning principles** scenarios downloaded from the LMS.

Use the space provided in the document to highlight bad practices and suggest the improvements that can be made to align with the six best practice principles.

pragma

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Scheduling

Good measures

Which one of the following measures commonly implemented to measure work do you think provides the most worthwhile information for evaluation purposes?

A. Schedule attainment

B. Resource allocation

C. Wrench time

D. Tactical vs non-tactical work

pragma

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Reflect on scheduling

Join your breakout rooms and discuss the following questions.
Prepare to give feedback to the rest of the class.

Group 1 and 2

Should one schedule 100% of the work? Why or why not?

Should the scheduler schedule the work per day or for the week and let the supervisor manage the daily schedule? Should this be done by a person or aggregated by trade?

Group 3 and 4

Which inputs should the scheduler consider when compiling the maintenance schedule?

Who needs to review and agree to the schedule? Within which timeframes should this happen?

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The six strategies for maintenance schedulers

pragma

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The impact of correct/incorrect scheduling

What do you think is the impact on the organisation if you assign a highly skilled technician to perform a menial maintenance task?

Type your answer using the public chat feature.

The impact of correct/incorrect scheduling

What do you think the impact could be if you assigned a non-skilled trainee to perform a highly technical maintenance task?

Type your answer using the public chat feature.

Plan for the lowest required skill level

Plan for the lowest skill level

Tasks providing the number of people required, lowest required skill level, work hours per skill level, and work order duration information are necessary for advanced scheduling.

pragma

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Plan for the lowest required skill level

Plan for the lowest skill level

Planning is required before scheduling! A task should specify one fitter and one helper, if that is what is required, not two fitters.

This ensures that “at least” the minimum skill levels required will be assigned to the task, but it also gives the section supervisor flexibility to assign higher qualified trades.

If one person can do the work in ten hours and it will take two people five hours to do the work, find out from the supervisors what their preferences are.

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Plan for the lowest required skill level

Plan for the lowest skill level

Common mistakes made by schedulers:

- Always assigning two people
- Setting times as whole or half increments of a shift

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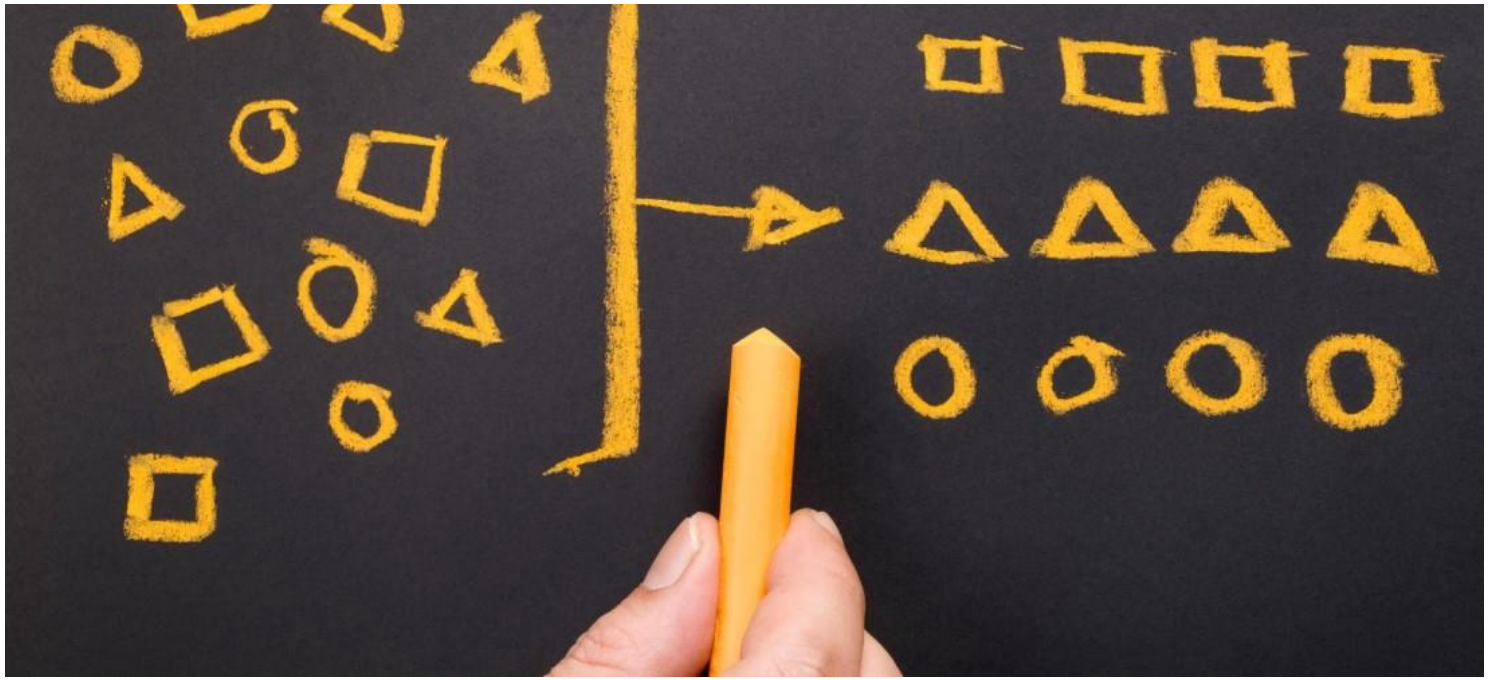
Determine priorities



What influences your decision as to which tasks need to be prioritised?

Type your answer using the public chat feature.

Priorities are important

Priorities are important

Weekly and daily schedules must be adhered to as closely as possible. Proper priorities must be placed on new work orders to prevent unnecessary interruption of these schedules.

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Priorities are important

Priorities are important

Urgent work that is not an emergency should be started as soon as the current task is completed. Current work may be interrupted for emergency work.

If tasks are routinely prioritised as urgent or emergency, two problems arise:

- The section is unable to complete their allocated workload due to numerous interruptions and increased waste.
- True instances of when schedules or work should be interrupted are very difficult to recognise.

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Work to be scheduled

How do you know how much work to schedule for a section? What is the difference between planning and scheduling?

Type your answer using the public chat feature.

Available work hours

Available work hours

During scheduling, a one-week schedule for each section is developed based on a forecast of available work hours.

Consideration is also made for work order priorities, location, estimate times and tactical versus non-tactical work.

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Available work hours

Available work hours

Advanced scheduling ensures that enough work is assigned to maintain high levels of labour utilisation.

Properly defined task or work order priorities ensure that the right work is being carried out.

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Available work hours

Available work hours

During scheduling, a one-week schedule is prepared with all the work orders that the section should be able to complete within the week, not a detailed schedule of exact personnel and time slots.

This schedule is sent to:

- sections – this shows them the goals for the coming week, and supervisors see what coordination is required
- operations or production – understands which equipment will have to be available for maintenance
- Management – sees progress on work orders.

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Available work hours

Available work hours

A one-week schedule is based on the highest skills available and work order priorities.

Focusing on the highest skills available provides more flexibility when actually determining which tasks can be executed the next week.

Making sure that higher-priority work is selected ensures maximum returns on maintenance effort.

pragma

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Schedule for hours available

Schedule for every work hour

The one-week schedule assigns work for every available work hour. The schedule allows for emergency and high-priority reactive work by scheduling a sufficient number of work hours on easily interrupted tasks.

pragma

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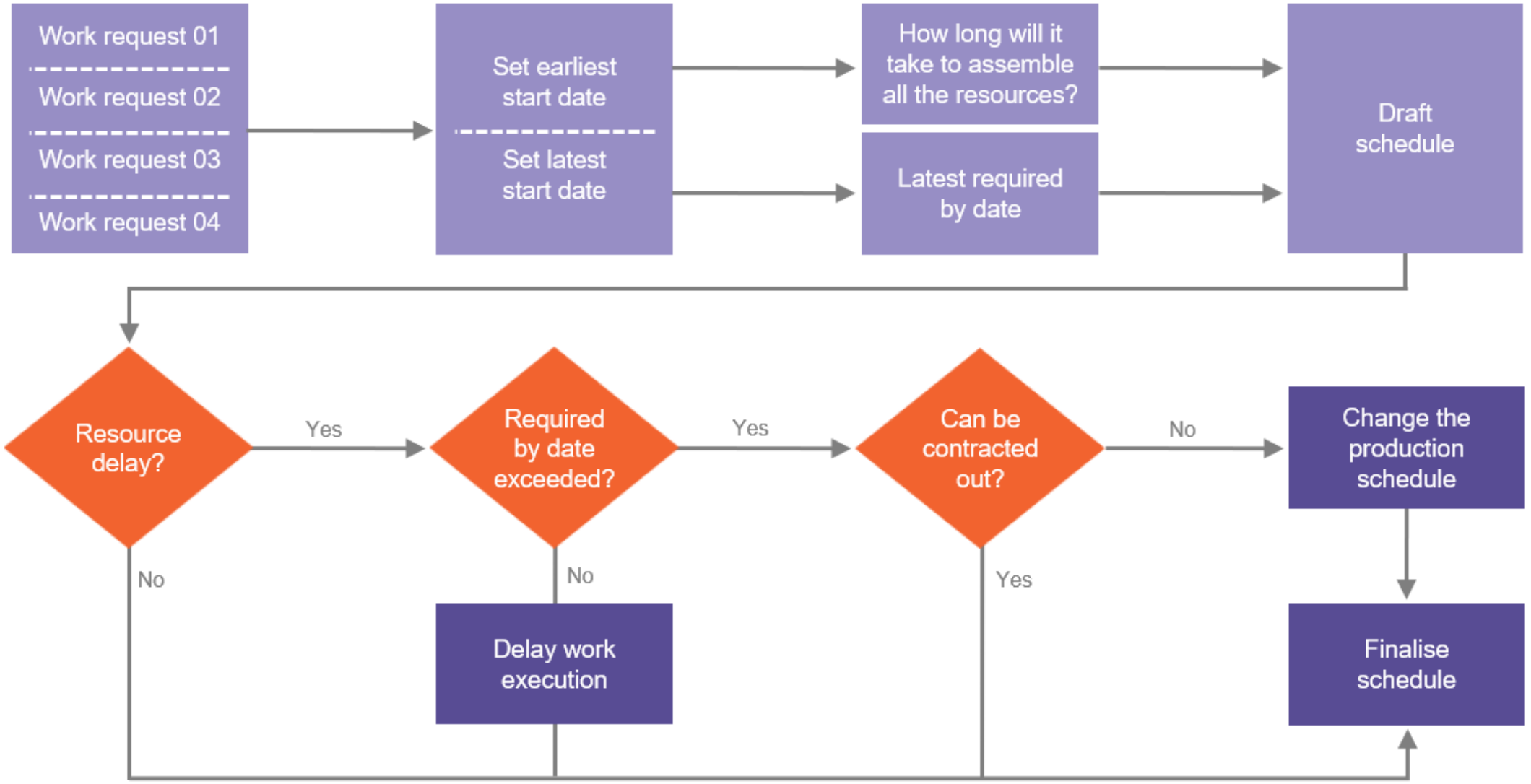
Scheduling decisions



Scheduling for hours available

Which is the better option: A or B?

A

- Schedule based on 80% of available hours
- Allow for unspecified delays (the 20%)
- Target schedule attainment = 100%

B

- Schedule based on 100% of available hours
- Build in 20% easily deferrable work
- Target schedule attainment = 80%

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Scheduling for hours available

Let us discuss why you chose that option in the poll and also talk about what is the better option and under what circumstances.

A

- Schedule based on 80% of available hours
- Allow for unspecified delays (the 20%)
- Target schedule attainment = 100%

B

- Schedule based on 100% of available hours
- Build in 20% easily deferrable work
- Target schedule attainment = 80%

pragma

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Scheduling for hours available

Schedule for every work hour

The theory says: assign work for 100% of the forecasted hours.

So if the section had 1 000 work hours available in the next week, then 1 000 hours' worth of work orders should be assigned.

But be realistic; keep your current maturity in mind!

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Scheduling for hours available

Schedule for every work hour

Assigning work for 120% of the forecast hours makes it:

- difficult to gauge the performance of the team
- difficult to coordinate with Operations and other sections, because there is always the possibility that some of the work will not be completed.

Assigning work for 80% of the forecast hours means that:

- it is difficult to gauge the performance of the team
- having idle staff available for emergencies is counter-productive
- work order initiators may claim false emergency work, because they know that there is spare capacity available.

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Scheduling for hours available

Schedule for every work hour

Be realistic: the lower your site's maturity, the more difficult and impractical this principle will be to apply. If you perform large amounts of non-tactical work every week, you will have to make provision for this by evaluating your maintenance history.

Individual work orders may vary up to 100% in their duration, but research has shown that weekly plans only vary by approximately 5%.

High variation (individual work orders) requires that the supervisor takes responsibility for the daily assignment of work to specific resources (tradespeople, technicians, contractors).

pragma

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Scheduling for hours available

Schedule for every work hour

"Working persons down" to ensure that the most profitable work is being executed

Resources forecast

100 hours of fitters available

Planned backlog

- 100 work hours of high-priority helper work
- 100 work hours of low-priority fitter work

Note: we are only scheduling at this point, not performing allocation!

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Supervisor handles the current day

Supervisor handles current day

The supervisor develops a daily schedule one day in advance using the current WO progress, one-week schedule, and new, high-priority, non-tactical WOs as a guide. The supervisor matches tradesperson skills and tasks.

pragma

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Measure performance

What is the ideal way of measuring schedule attainment?

A. Number of tasks

B. Number of hours

pragma

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Measure performance

	Scheduled	Started	Finished	Attainment
Case 1	10	10	9	100% or 90%?
Case 2	1	1	0	100% or 0%?
Case 3	1 000hrs	900hrs	850hrs	90% or 85%?

Should schedule attainment only consider finished tasks or also started tasks? Type your answer using the public chat feature.

pragma

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Measure performance

Measure performance

Schedule attainment is the measure of adherence to the one-week schedule and its effectiveness.

pragma

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Measure performance

Measure performance

Weekly schedule attainment not only gives you an indication of how well the section is executing the plan, but it also gives you an indication of who is in control.

Maintenance has control over equipment – they decide when to take certain actions to preserve equipment.

Equipment has control over Maintenance – equipment drives the maintenance efforts which leads to a more reactive environment where sudden equipment problems arise and where scheduled work is often interrupted.

pragma

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Measure performance

Measure performance

Weekly schedule attainment provides a measure of accountability. It guards against sections working on pet projects or other tasks that are not more important than the allocated work.

Weekly schedule attainment provides a standard against which to discuss actions:

- The supervisor must explain any variances from the plan.
- Tradespeople and technicians must explain any variances in work hours or durations on specific tasks.

pragma

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Scheduling principle improvements

Join your breakout room as per the allocated groups. Engage with the scenarios given to your group as follows:

- Group 1 Scenario 2 and 3
- Group 2 Scenario 4 and 5
- Group 3 Scenario 2 and 3
- Group 4 Scenario 4 and 5

Read the **six scheduling principles** scenarios downloaded from the LMS.

Use the space provided in the document to highlight bad practices and suggest improvements that can be made to align with the six best practice principles.

Reflect on the learning objectives of this module

Are you able to:

- explain the critical objectives of maintenance planning
- describe the benefits to the organisation if planning is done efficiently and effectively
- explain the six strategies for maintenance planners to achieve the objectives of planning
- recognise and distinguish between good and bad practices within planning and suggest improvements based on the strategies
- describe the benefits to the organisation if scheduling is done efficiently and effectively
- explain the six strategies of scheduling to achieve efficiency and effectiveness
- recognise and distinguish between good and bad practices within scheduling and suggest improvements based on the strategies?

A. Yes

B. No

C. Partially

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