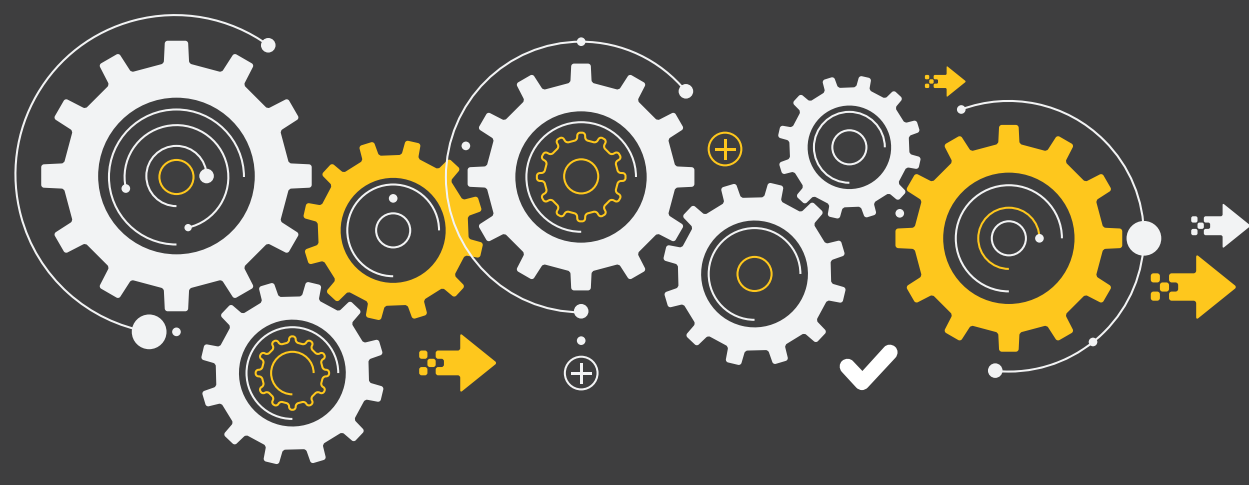


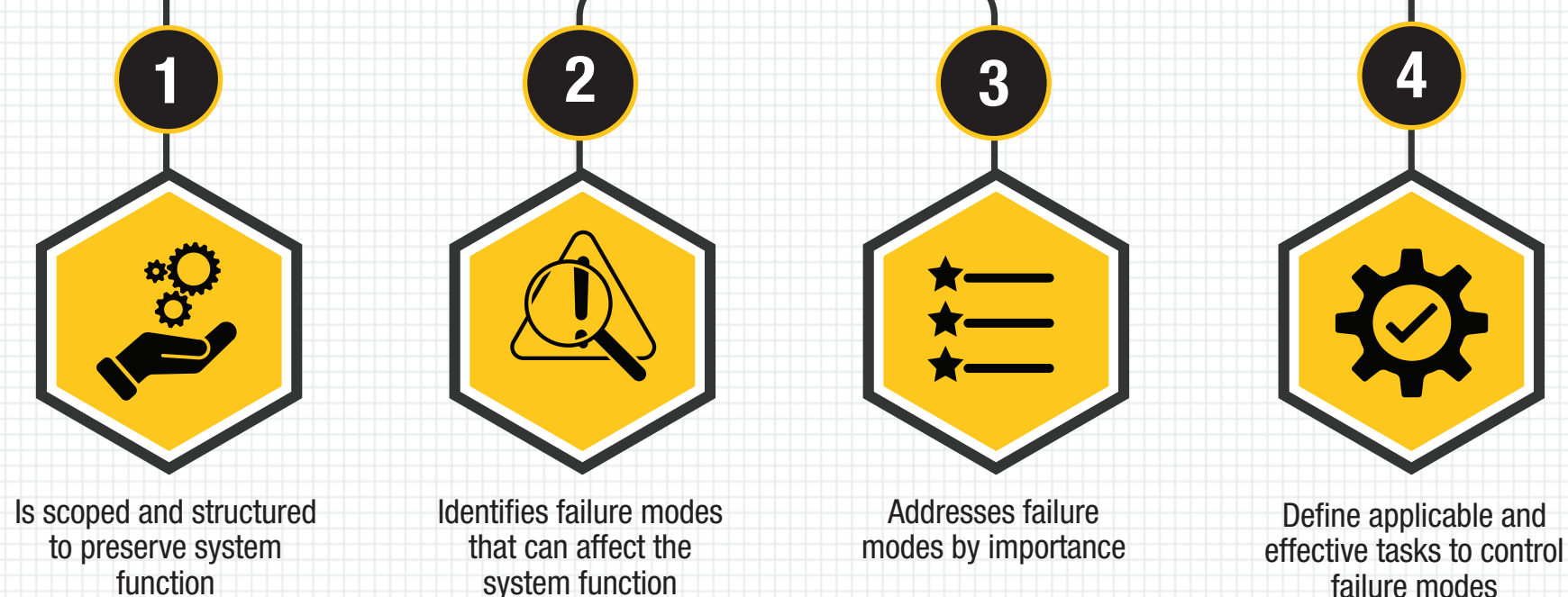
What is RCM?

Reliability Centered Maintenance



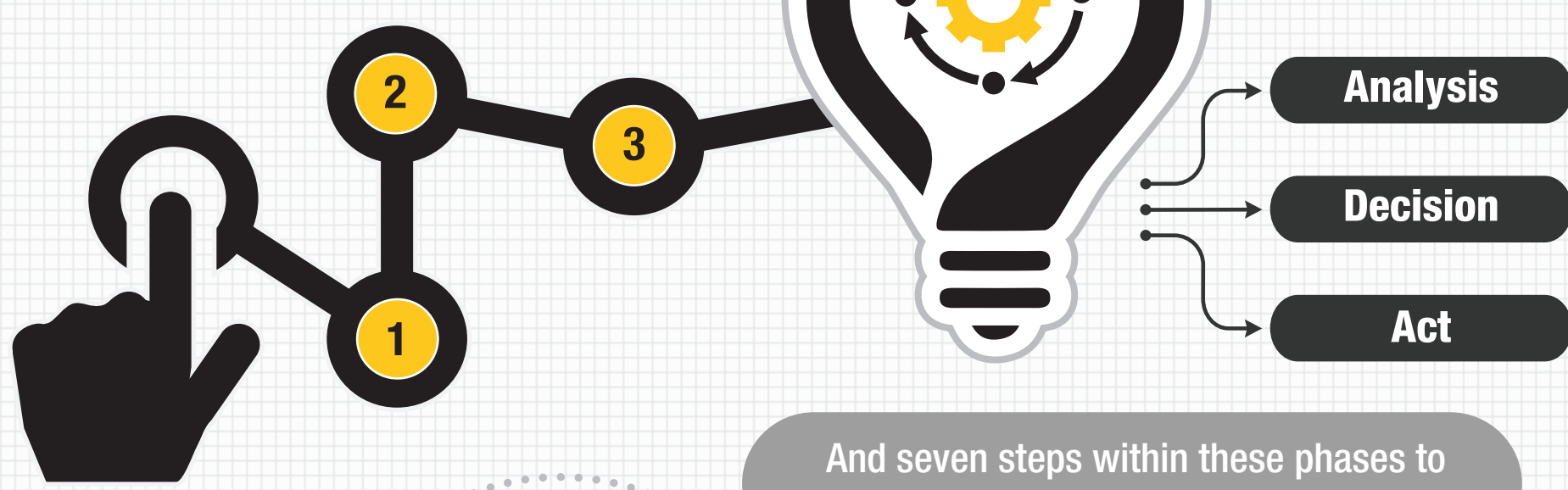
A process to determine what's needed to ensure that physical assets continue to operate at peak performance.

The four basic principles of a RCM program



How do you implement a Reliability Centered Maintenance program?

There are three phases of a Reliability-Centered Maintenance program



And seven steps within these phases to ensure the program is fully implemented.

Phase 1

Decision

Justification and planning based on need, readiness, and desired outcome

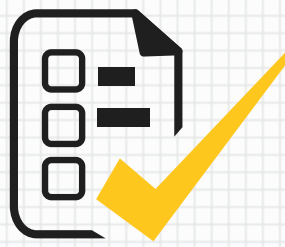
#1

Analysis Preparation



OUTLINE

Your organizational goals, project management concerns, budget and timeline, and potential obstacles.



CHOOSE

An effective team behind your RCM Analysis. The most effective, cross-functional teams include: maintenance employees, project leaders, subject matter experts, and if possible, executive leadership.

Select Equipment for RCM Analysis

#2

SELECT

Equipment for RCM analysis that is:

- Critical to operations
- Subject to the cost of repair vs. replace debate
- Included in previous spending on PM.

ASK

yourself these questions to select the best candidate: **Could failure...**

- be hard to detect during normal operations & maintenance?
- affect safety?
- have a significant impact on operations?
- increase costs and decrease profits?

#3

Identify Functionality

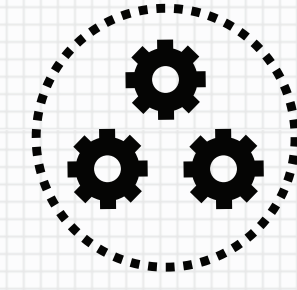
DEFINE

A complete list of a piece of equipment's functionality.



SPECIFY
Your desired asset performance levels

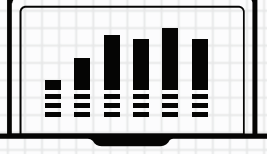
NOT
Actual performance, as it may reflect an operational or maintenance issue.



System functionality then drives the required functions of the equipment supporting the system functions.

INCLUDE

As much data-driven information as possible.



Analysis

Conduct the RCM study in a way that provides a high-quality output.

Phase 2

Identify Functional Failures

#4

Functional failure is the inability of an asset or system to meet acceptable standards of performance.

FAILURES CAN ENCOMPASS

- Poor Performance
- Over Performance
- Unnecessary Functions
- Unintended Functions
- Complete Failure

FOR EXAMPLE:

When a motor bearing is failing due to lack of lubrication, a Total Functional Failure would be the motor not rotating and failing to function.

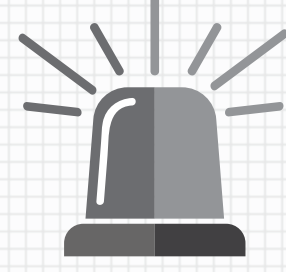
Identify & Evaluate the Effects of Failures

DOCUMENT
what actually happens when failures occur.

Identify Failure Modes

#6

One of the most common techniques to approach discovering failure modes is Failure Mode and Effects Analysis (FMEA). It's a step-by-step approach for identifying all manufacturing or assembly process, or a product or service.



- WHAT CAN BE OBSERVED?
- WHAT IS THE IMPACT ON PRODUCTION?
- IS THERE A SIGNIFICANT SAFETY IMPACT?

UNDERSTAND
the effects of failure involves asking questions such as:

- What are the safety concerns with this failure?
- What impact does this failure have on operation/production?
- Does this failure mode result in full or partial outages?

Phase 3

ACT

Act on the study's recommendations to update asset and maintenance systems, procedures, and design improvements.

#7

Select Maintenance Tasks

FAILURE MANAGEMENT TECHNIQUES
CAN BE GROUPED INTO 2 CATEGORIES:

- 1 Proactive tasks:** Preventive and Predictive Maintenance techniques are performed to prevent failure of a piece of equipment or system.
- 2 Default actions:** Firefighting, or Reactive Maintenance, deals with failures after the fact. Run-to-failure is a tactic where equipment is run until it fails, and then work is performed.

SELECT
the right strategy for failure management by understanding:

- The failure modes
- Criticality of equipment
- The economic impact of failure