

Project Time Management

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PMG 212

Lecture 2



Agenda

Project Control

- Introduction to Project Control
- Performance Measurement
- Purpose of a Performance Measurement Baseline
- Components of the Performance Baseline
- Components and Assembly of the Performance Baseline
- Scope
- Contract Terms and Conditions (CTC)
- Project Execution Plan (PEP)
- Schedule
- Work Breakdown Structure
- Work Breakdown Structure Benefits
- Organizational Breakdown Structure
- WBS/OBS Diagram
- Ownership
- The Concept of Rolling Wave Planning

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Introduction to Project Control

- ❑ Understanding project control as a management discipline
- ❑ Focus on time, cost, and performance monitoring
- ❑ Essential across industries: IT, manufacturing, R&D, services
- ❑ Benefits of proactive control: avoid delays, overruns, risks
- ❑ Example: Apple tracks cost and schedule in product launch programs

Project Management vs Project Control

- ❑ Project management: overall planning and execution
- ❑ Project control: monitoring and steering performance
- ❑ Focus on measurable variables: time and cost
- ❑ Supports decision-making and corrective actions
- ❑ Example: Microsoft integrates project control into software rollout



Why Project Control Matters

- ❑ Technical success $\neq$ overall success
- ❑ Cost overruns reduce profitability
- ❑ Schedule delays affect stakeholder satisfaction
- ❑ Early control prevents cascading problems
- ❑ Example: Boeing faced delays in 787 Dreamliner, highlighting cost and schedule control needs



Definition of Project Control

- ❑ Integration of cost, schedule, and performance data
- ❑ Continuous monitoring against baseline plan
- ❑ Identification of deviations and corrective action
- ❑ Enables informed decision-making
- ❑ Example: Siemens monitors large-scale energy projects using real-time dashboards



Key Variables in Project Control

- ☐ Time as a performance constraint
- ☐ Cost as a financial constraint
- ☐ Interdependence of time and cost
- ☐ Performance must be measured against plan
- ☐ Example: Amazon monitors delivery and logistics projects with tight schedules



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Performance Measurement

- Accurate performance measurement ensures true project progress.
- Provides early warning signs for at-risk projects.
- Foundation for Earned Value Analysis (EVA).
- Involves selecting the right progress calculation method.
- Six recognized methods are commonly used in construction projects.

Performance Measurement

Methods of Measuring Progress

1. Units Completed
2. Incremental Milestone
3. Start/Finish
4. Cost Ratio
5. Experience/Opinion
6. Weighted or Equivalent Units

Performance Measurement

Method 1 – Units Completed

- Suitable for **repetitive, easily measurable tasks**.
- Each unit takes approximately the same effort/time.
- $\text{Progress} = (\text{Completed Units} \div \text{Total Units}) \times 100\%$.
- Example: 100 fixtures installed out of 200 → 50% complete.
- Objective, simple, and widely applicable.

Performance Measurement

Method 2 – Incremental Milestone

- Used for **sequential subtasks** within one major task.
- Each subtask = a **mini milestone** with a defined % weight.
- % complete based on **labor hours** per subtask.
- Example: Foundation wall operations (layout, rebar, pour, strip, etc.).
- Requires **pre-agreed weightings** between stakeholders.

Performance Measurement

Method 3 – Start/Finish

- Used for **short-duration tasks** with no intermediate milestones.
- Earned value given **at start and finish only**.
- Common rules:
 - **50/50 Rule** → 50% at start, 50% at finish.
 - **20/80 Rule** → 20% at start, 80% at finish.
 - **0/100 Rule** → No value until completion.
- Suitable for tests, inspections, or short-duration tasks.

Performance Measurement

Method 4 – Cost Ratio

- Best for **long-term, continuous tasks** (e.g., project management, QA).
- Progress tied to **overall project completion %**.
- Example: If project = 42% complete → Earned 42% of overhead & fee.
- Based on **dollar allocation**, not physical work.

Performance Measurement

Method 5 – Experience/Opinion

- **Most subjective** method.
- Based on **expert judgment or estimation**.
- Used only for **minor or hard-to-measure tasks**.
- Risk: can cause **disputes** between owner and contractor.
- Should be avoided when possible.

Performance Measurement

Method 6 – Weighted or Equivalent Units

- For **complex, multi-unit tasks** with dissimilar measurements.
- Each subtask assigned a **weight** (labor hours or cost).
- Converted into a **common equivalent unit** (e.g., tons of steel).
- Enables accurate progress calculation across subtasks.
- Example: Structural steel erection progress measured in tons.

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Purpose of a Performance Measurement Baseline

- Roadmap for project execution
- Integration of project components
- Basis for change management
- Project communication
- Basis for project status and metrics

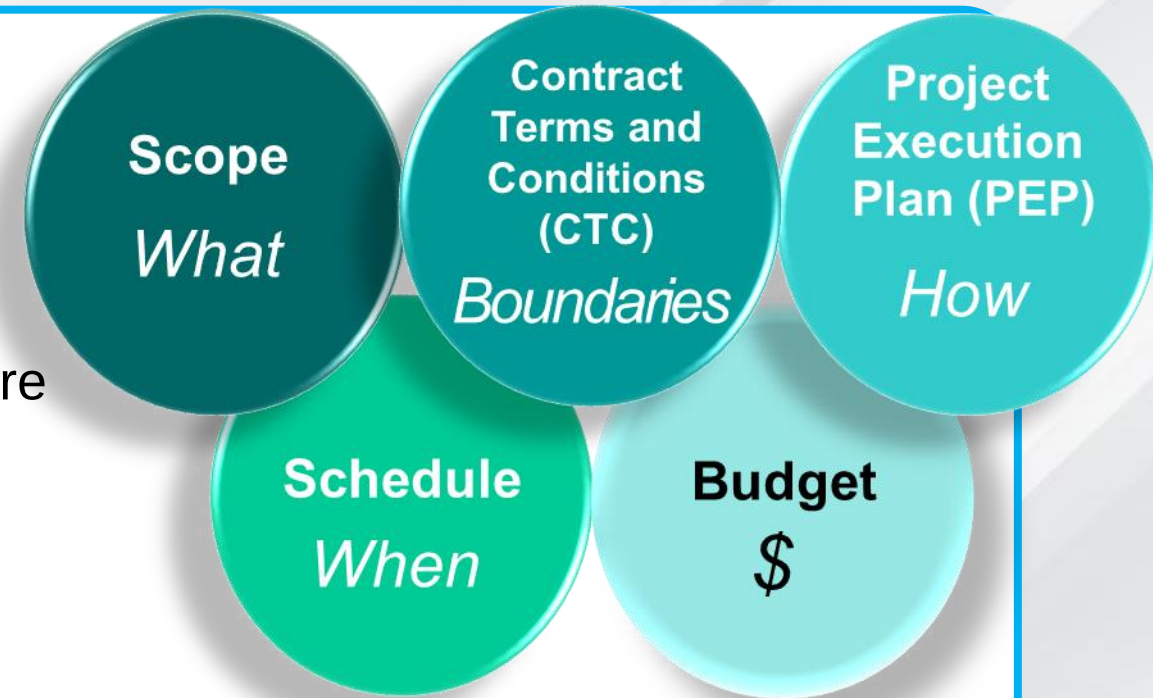
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Chapter 02

Components of the Performance Baseline

- All five components interact and must be combined in baselining.
- Project team members must be made aware of the components within their area of responsibility.

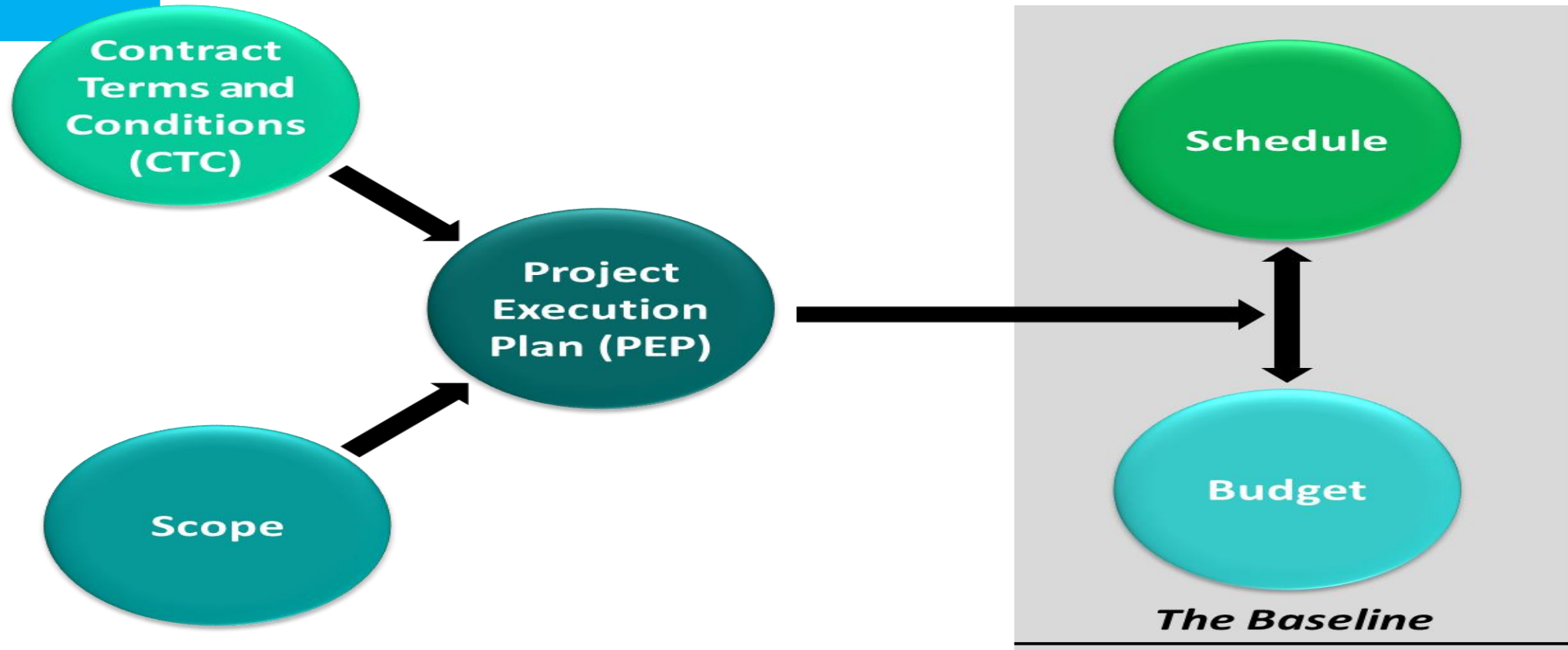


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Chapter
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Components and Assembly of the Performance Baseline

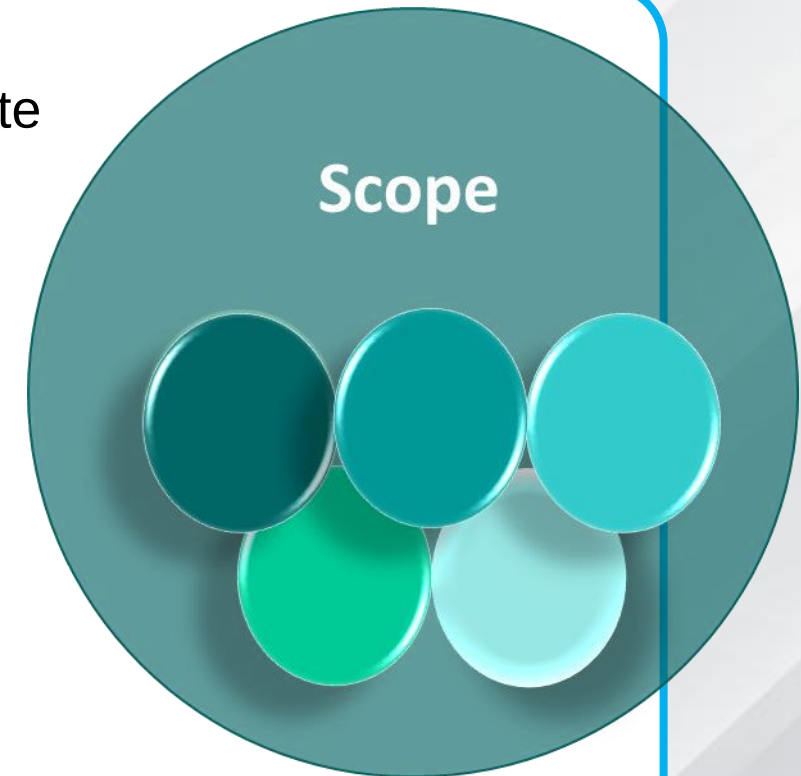


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Scope

- ❑ Defines the work the contractor or supplier is required to complete
 - Statement of Work
 - Scope determines the cost and schedule
 - Creation of Work breakdown structure



Scope – Case study -1

2 SCOPE OF WORK

Description

The CONTRACTOR's scope of works is the erection of the outstanding structural steel members within the Utilities plant Project (KUT)

These members vary in size, location and elevation and are a mixture of cable tray/HVAC ducting supports and structural steel members. Appendix 1 shows a breakdown of the steelwork by geographical area within the plant.

The steelworks can be divided into two categories :-

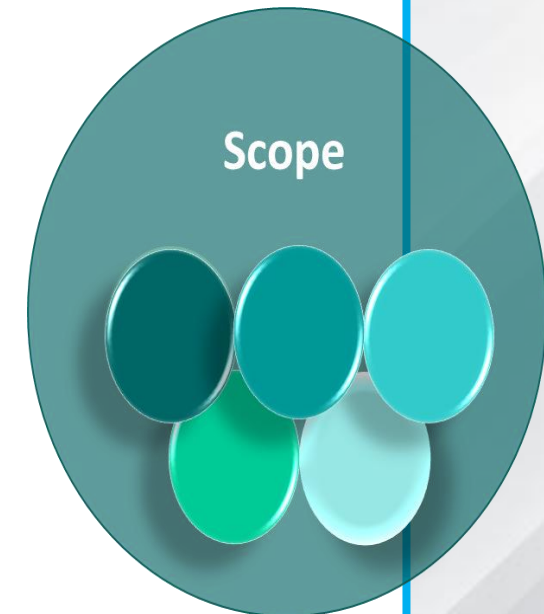
- New steelwork that is presently under manufacture in Turkey and which is due for delivery to site during July 2009
- Steelwork already available at site, but which is in varying stages of completion



2 SCOPE OF WORK**Description**

- Line checking, punch clearing of all items categories including those items may require minor construction activities for the completion of piping circuit.
- Conduct any required types of testing such as Hydro, Pneumatic, Visual and or leak testing.
- Reinstatement of test packs post hydro testing including bolt tightening and tensioning.

ACTIVITY	ESTIMATED QUANTITY
Line Checking And Punch Clearing	720 Test Packs
Testing (Hydro, Pneumatic, Visual Or Leak)	720 Test Packs
Reinstatement	720 Test Packs
TOTAL	2,160 Test Packs



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Contract Terms and Conditions (CTC)

☐ Contract terms and conditions address:

- Rights and obligations
- Contract form and function
- Risk allocation
- Contract management process, including dispute resolution



Contract Terms and Conditions (CTC)

- ❑ Contract terms and conditions address:
 - Payment terms
 - Quality requirements
 - Acceptance and testing requirements
 - Reporting requirements



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Project Execution Plan (PEP)

- ❑ Defines the execution approach
 - Identifies how engineering will be carried out
 - Identifies how equipment and materials will be acquired
 - Identifies how construction will be completed



Project Execution Plan (PEP)

- ❑ Defines the execution approach
 - Identifies what all functions (E, P, C, PC, Contracts, Startup, and others) will do in delivering the project and how they will do it
 - Describes how handoffs, interfaces, and integration between functions will work

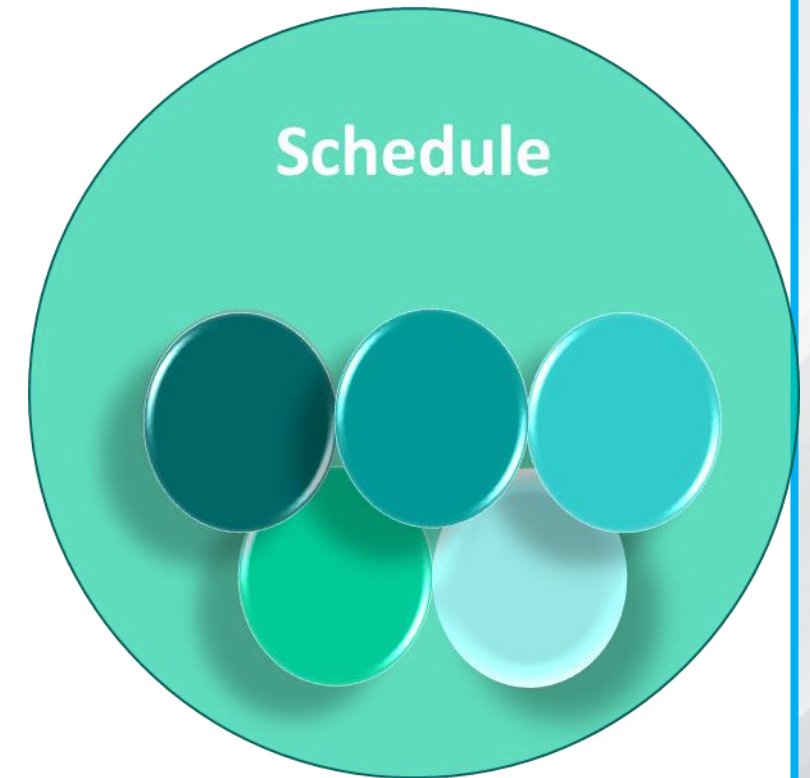


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Schedule

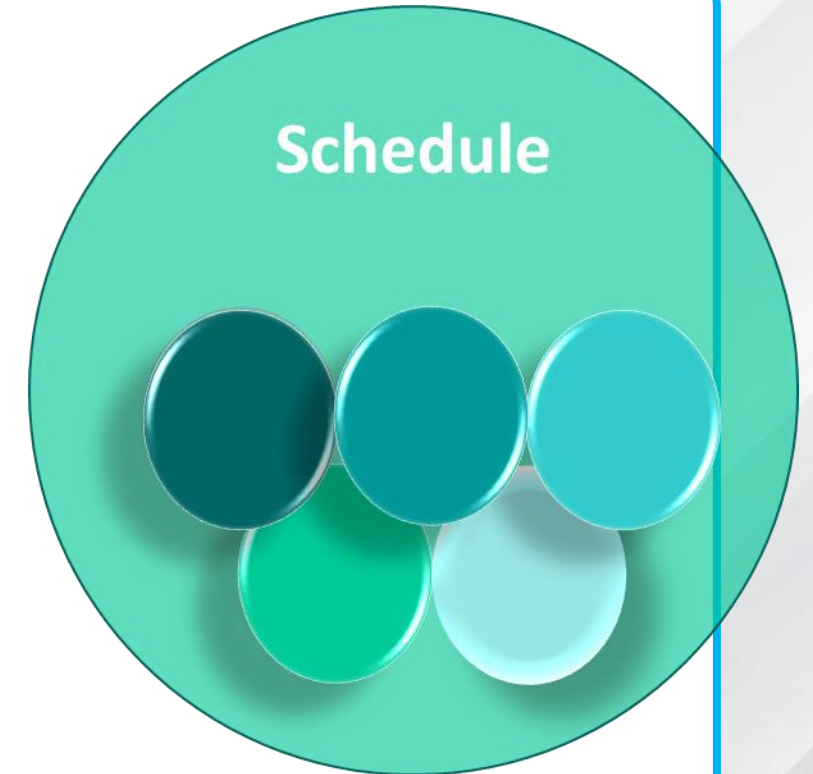
- ❑ Management Schedule (Level I) includes:
 - Major milestones
 - Long lead items
- ❑ Control Schedule (Level III)
 - Part of the contract
 - The CS is a package containing:
 - Major milestones
 - Engineering Work Packages (EWP)
 - Procurement and Long lead items



Schedule

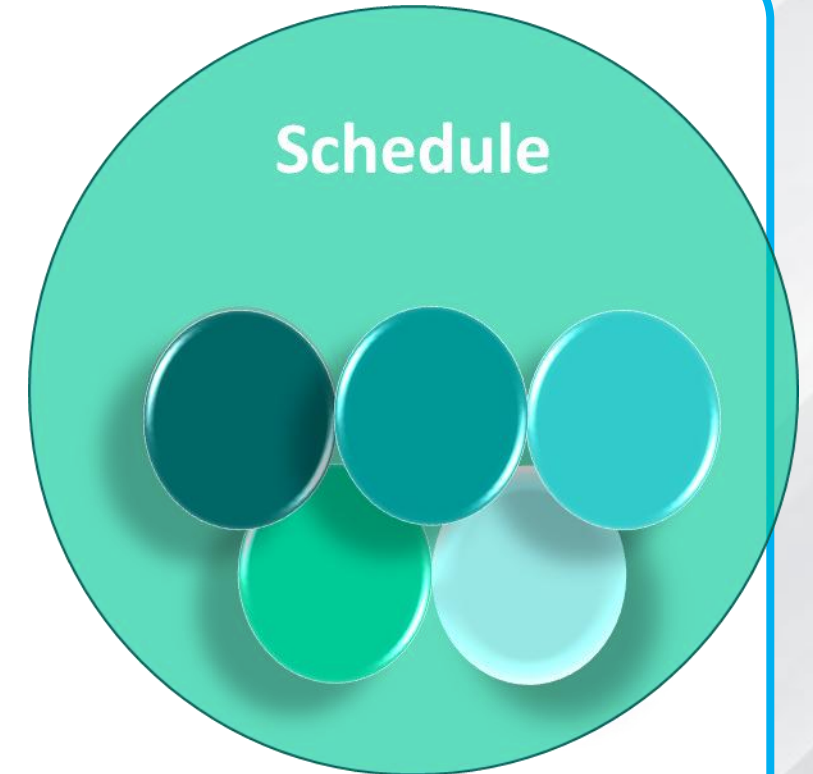
❑ Control Schedule (Level III)

- The CS is a package containing:
 - Construction Work Packages
 - Critical path activities
 - Resources loaded schedule
 - Progress curves
 - Bulk commodity curves (concrete, structural steel, piping, wire & cable, etc.)



Schedule

- ❑ Always provide the Basis of Schedule (assumptions, exclusions, allowances, etc.).
- ❑ Level II Summary Schedules and Level IV Medium Term Schedules are used when needed.



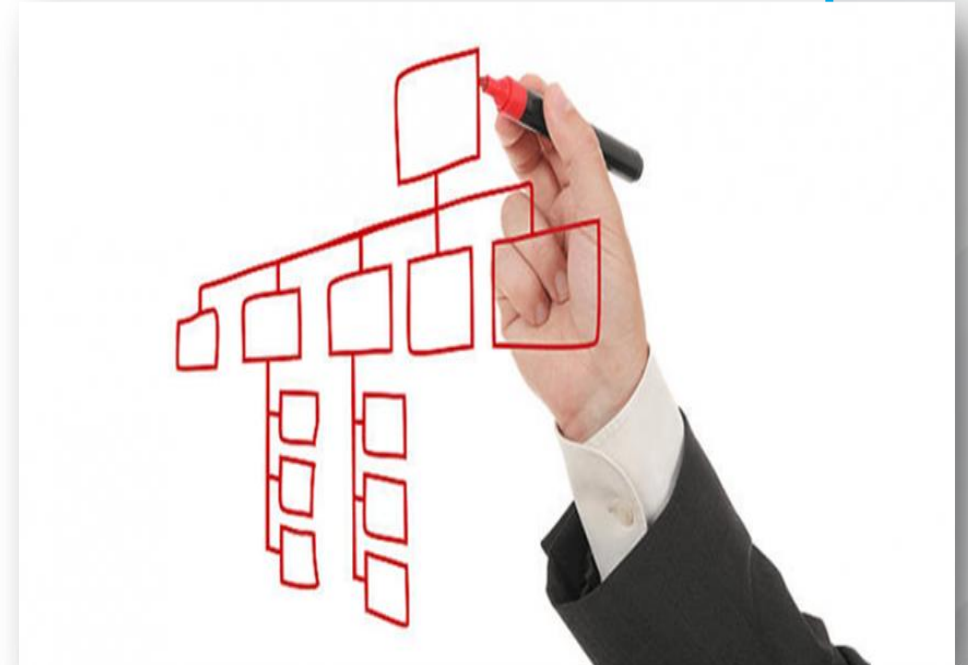
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Chapter
02**Work Breakdown Structure**

The Work Breakdown Structure (WBS) is a hierarchical code structure representing the entire work scope of a project. The WBS:

- Integrates project data from Engineering, Procurement, Construction, and Startup.



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Work Breakdown Structure

- Is used to separate project scope into manageable subsections, facilitate communication, and identify integration points for project plans.
- Provides a systematic approach to ensure key scope and activities are not omitted.



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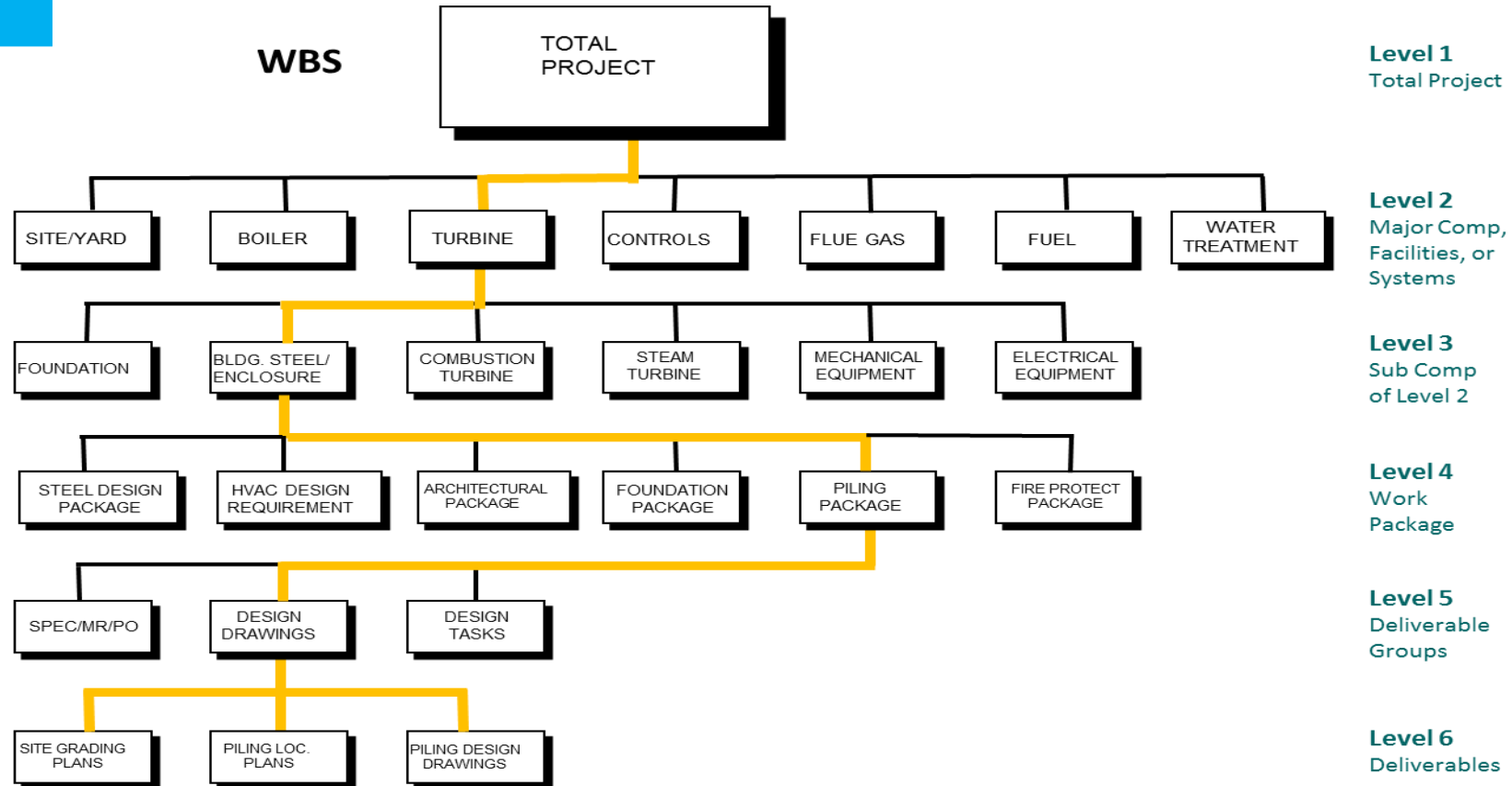
Work Breakdown Structure Benefits

- Facilitates systematic planning
- Removes project complexity by allocating scope
- Provides a framework for:
 - Defining specific tasks
 - Linking activities and resources
 - Facilitating communication
 - Allowing integration of project plans



Chapter
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Work Breakdown Structure Example



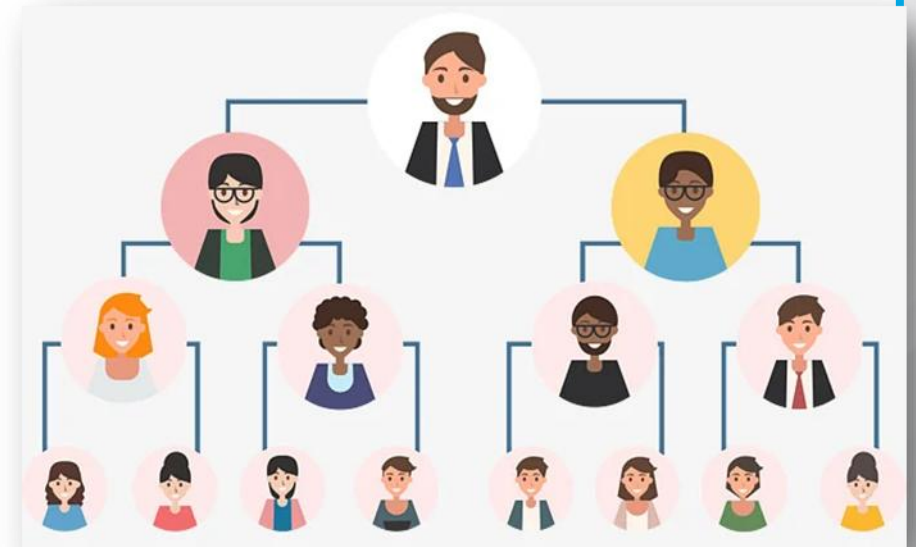
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Organizational Breakdown Structure

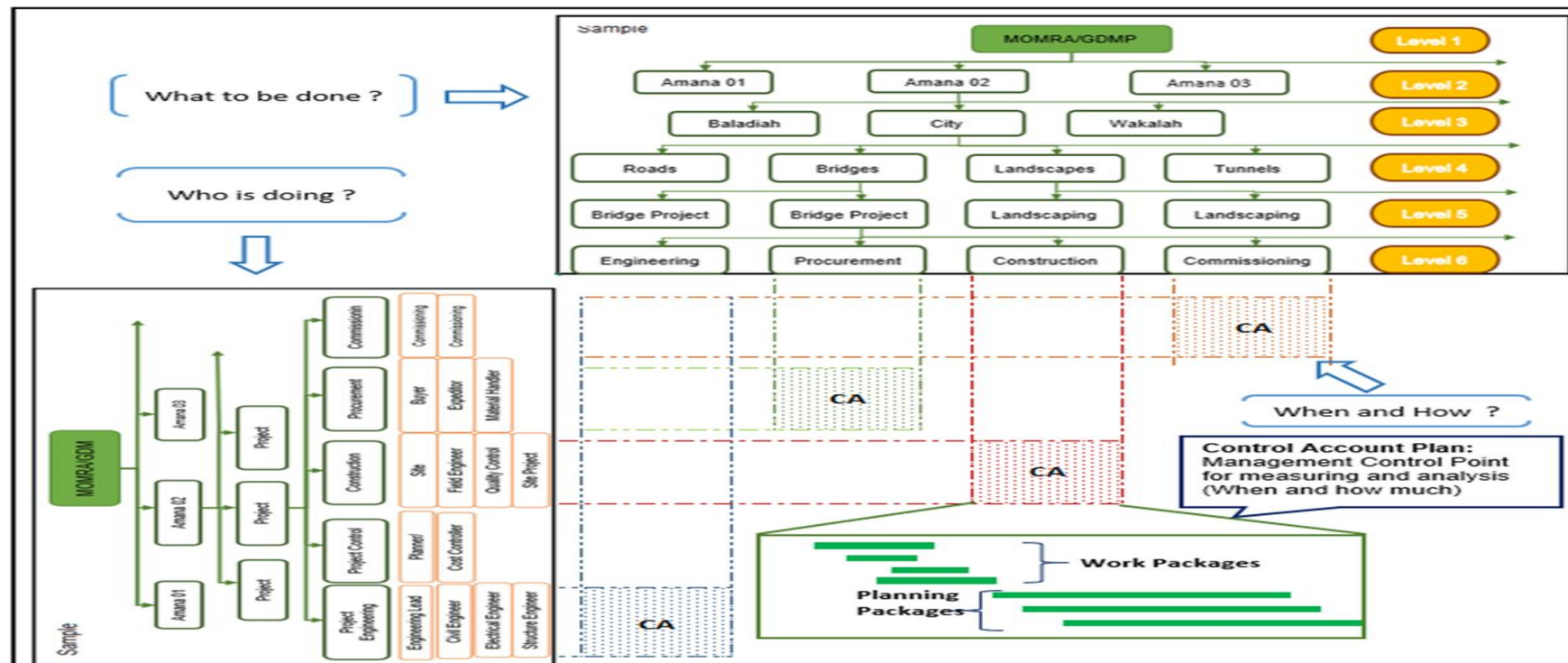
- Takes the WBS and merges with the organization and individuals assigned to the project
- Benefits:
 - Enables clear assignment of scope to team members
 - Facilitates ownership and accountability
 - Assures all project elements are accounted for



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WBS/OBS Diagram

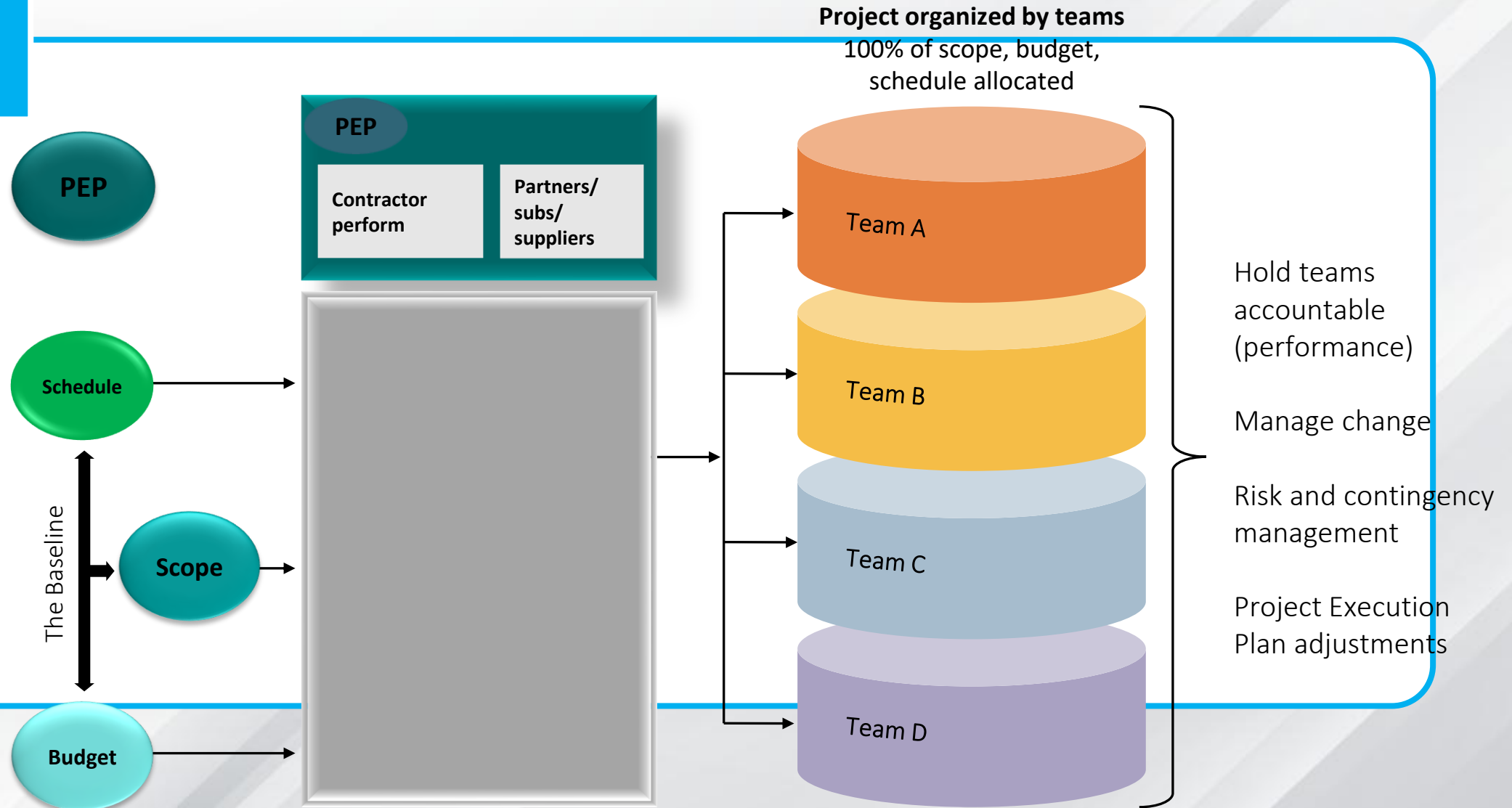


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Ownership



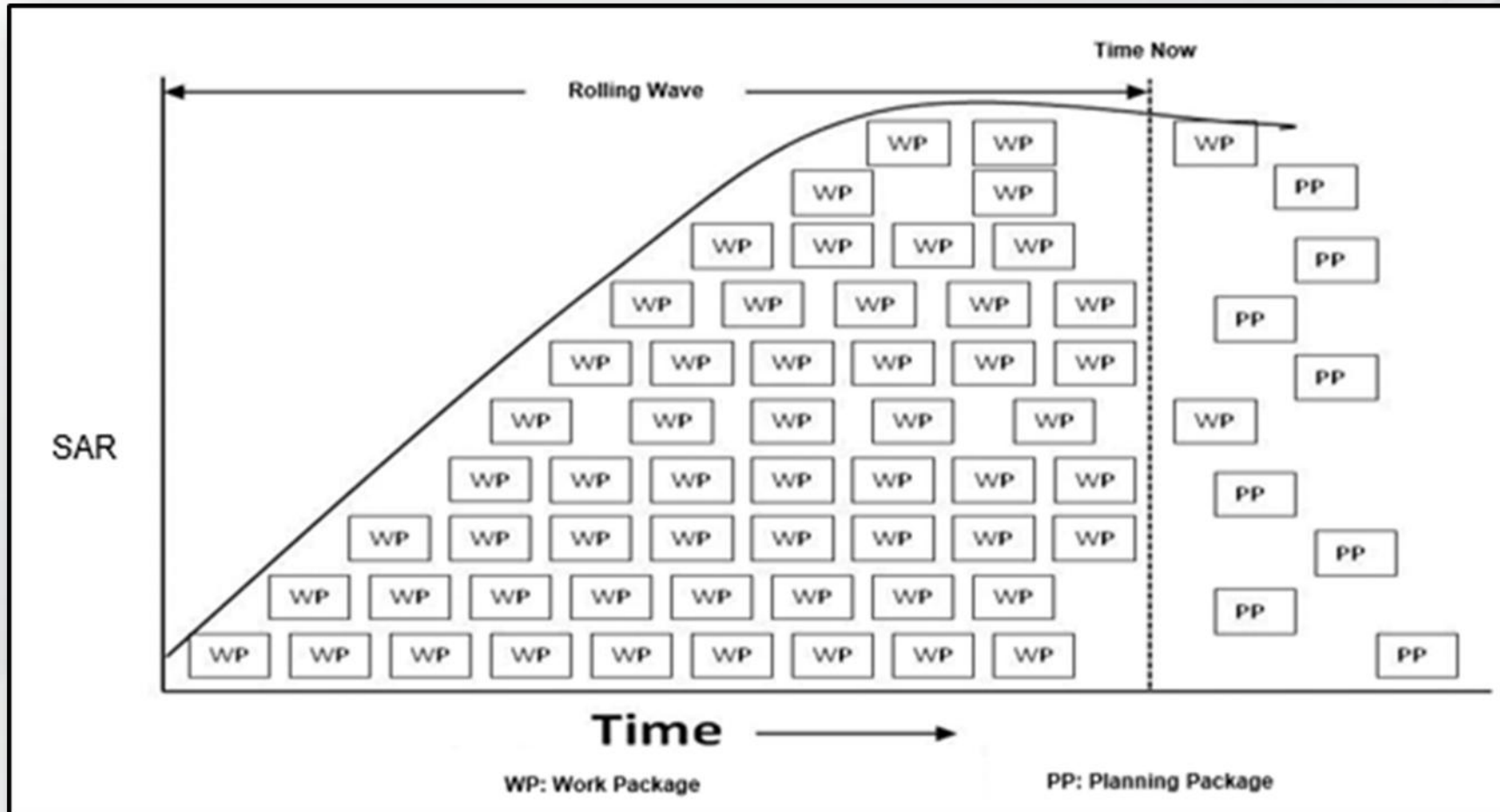
Alignment and Ownership of the Baseline Benefits

- Ensure teams know and accept their scope, schedule, and budgets.
- Drive ownership.
- Ensure that stretch goals and targets are defined and accepted by the teams.
- Establish an environment of accountability.

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The Concept of Rolling Wave Planning



The Concept of Rolling Wave Planning

The Concept of Rolling Wave Planning

- Rolling wave planning is a project management technique that involves progressive elaboration to add detail to the Work Breakdown Structure (WBS) on an ongoing basis.
- At the beginning of the project, near term deliverables are decomposed into individual components (work packages) and defined at the greatest level of detail.

The Concept of Rolling Wave Planning

- Deliverables and schedule activities that will take place several reporting periods in the future are more broadly defined. For example, Phases 1-2 might be broken down fully in the WBS.
- Phases 3-6 might be outlined only to the level of subprojects.



Thank You