Best Practices in Planning & Scheduling

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total
resource
management
A Consulting and Technology Company

- # **Objective:** Provide strategy and tactics for using Maximo to achieve success in Planning & Scheduling

- # **Agenda**

  - ## **Introduction to Planning & Scheduling in the EAM Domain**

  - ## **Selling P&S to the Organization**

  - ## **Roadmap to implementation**

  - ## **Metrics & KPIs**

  - ## **Benefits Calculator**

About Total Resource Management (TRM)

- **Leading Maximo solutions provider for 20+ years, an IBM Premier Business Partner and Maximo Gold Certified**

- **Integrated system & industry expertise and consulting**:
  - Utilities, Water & Wastewater, Oil & Gas, Manufacturing, Public Sector…
  - Reputation of delivering value and performance to every Maximo project, on-time and within budget, every time

- **Award-winning [TRM RulesManager Studio™](#) – only unified solution to develop, deploy, configure, monitor and extend Maximo** (without java coding)
  - Recent release of MaxAssist for dynamic user help at application level
  - CheckPoint allows you to snapshot your Maximo environment
  - RampUp enables recording of mouseclicks and keystrokes to build test scripts and test system performance
  - Lincense Evaluation tool gives you the ability to both see where your Maximo licenses are being used and allocate them where they should be used,

- **TRM is a full-service High Performance Cloud™ for Maximo provider (**Public, Private, Hybrid ; TRM or Softlayer hosted)
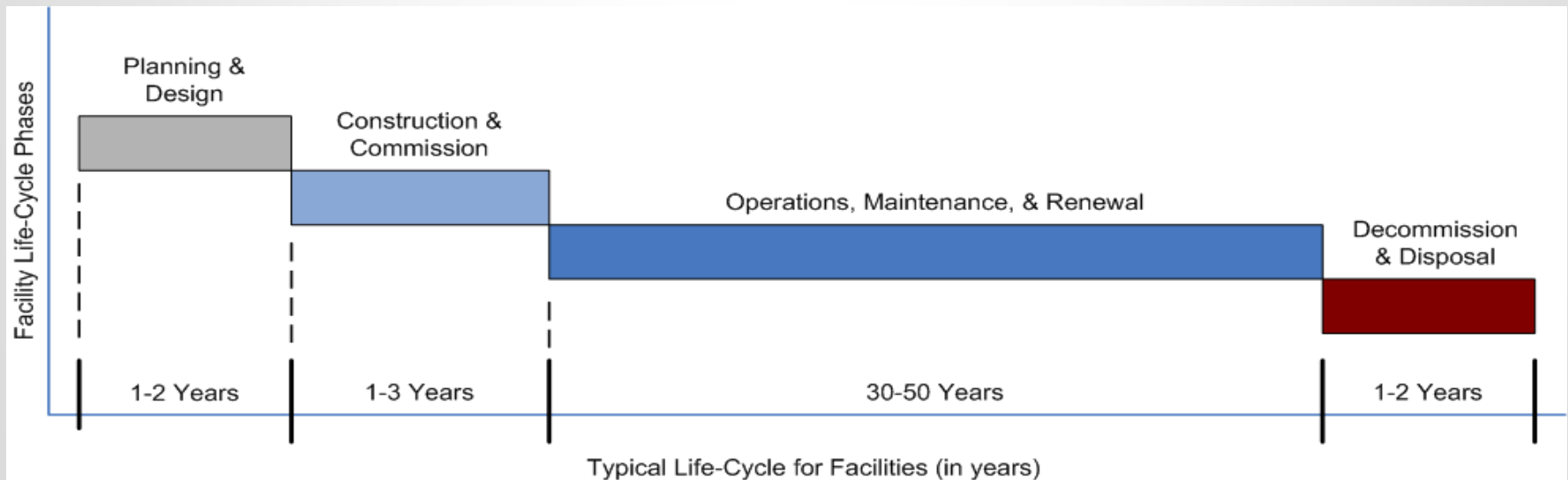
# Planning & Scheduling Overview

Enterprise Asset Management

Enterprise asset management (EAM) *is the whole-life* **optimal** *management of an organization's physical assets to maximize value.*

It covers such phases as design, construction, commissioning, operations, maintenance and decommissioning/replacement of plant, equipment and facilities.

Asset Management Is…

- A Structured Approach to Managing Infrastructure Assets

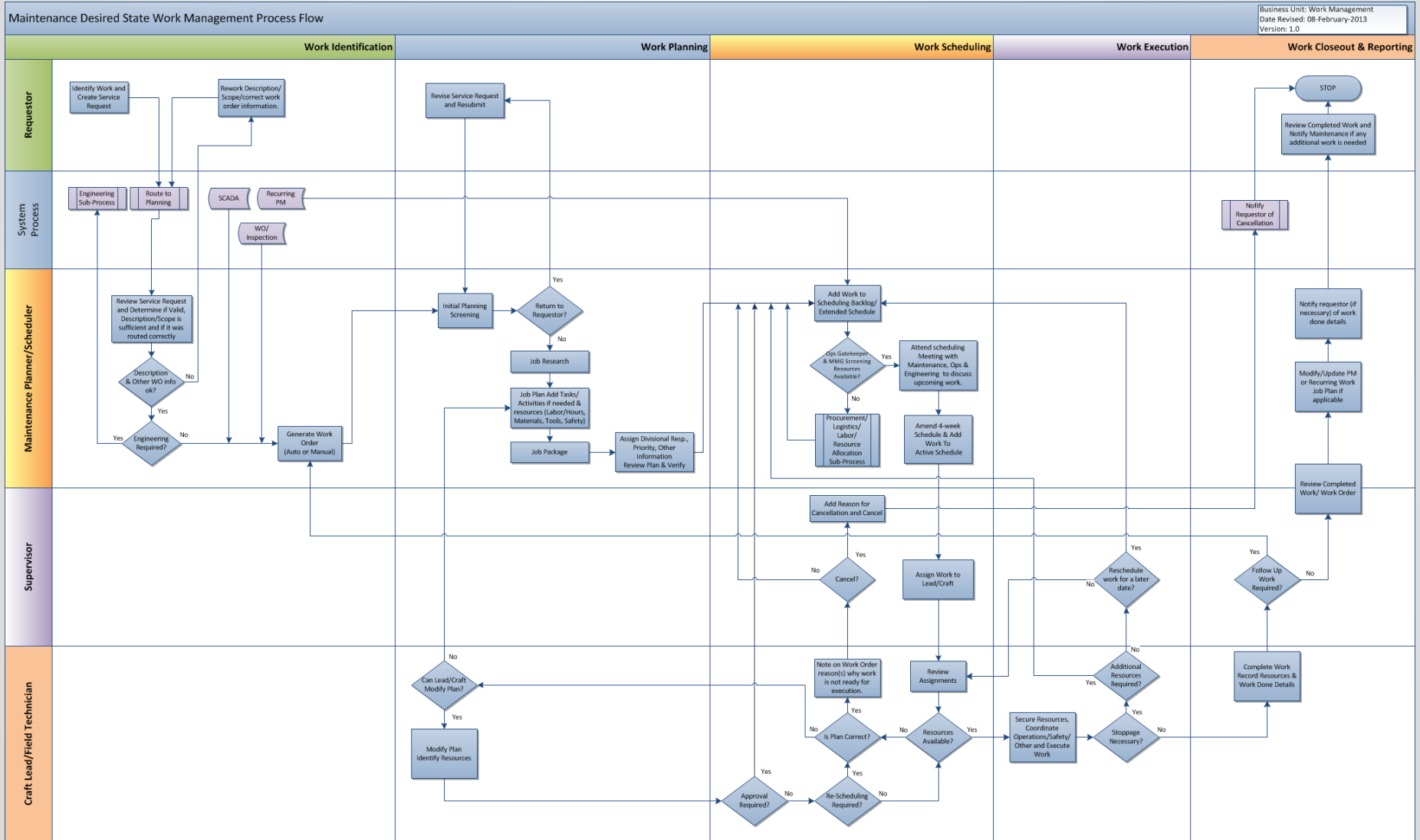- A Framework for Improving Decisions About How and When to Acquire, Operate, Maintain, Renew, and Dispose of Assets
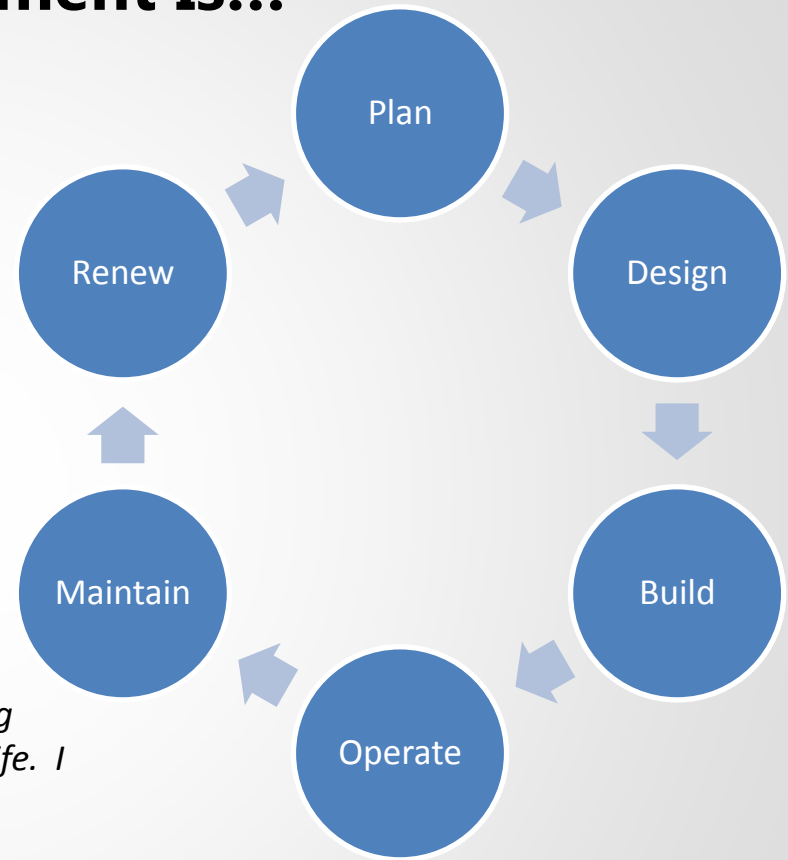
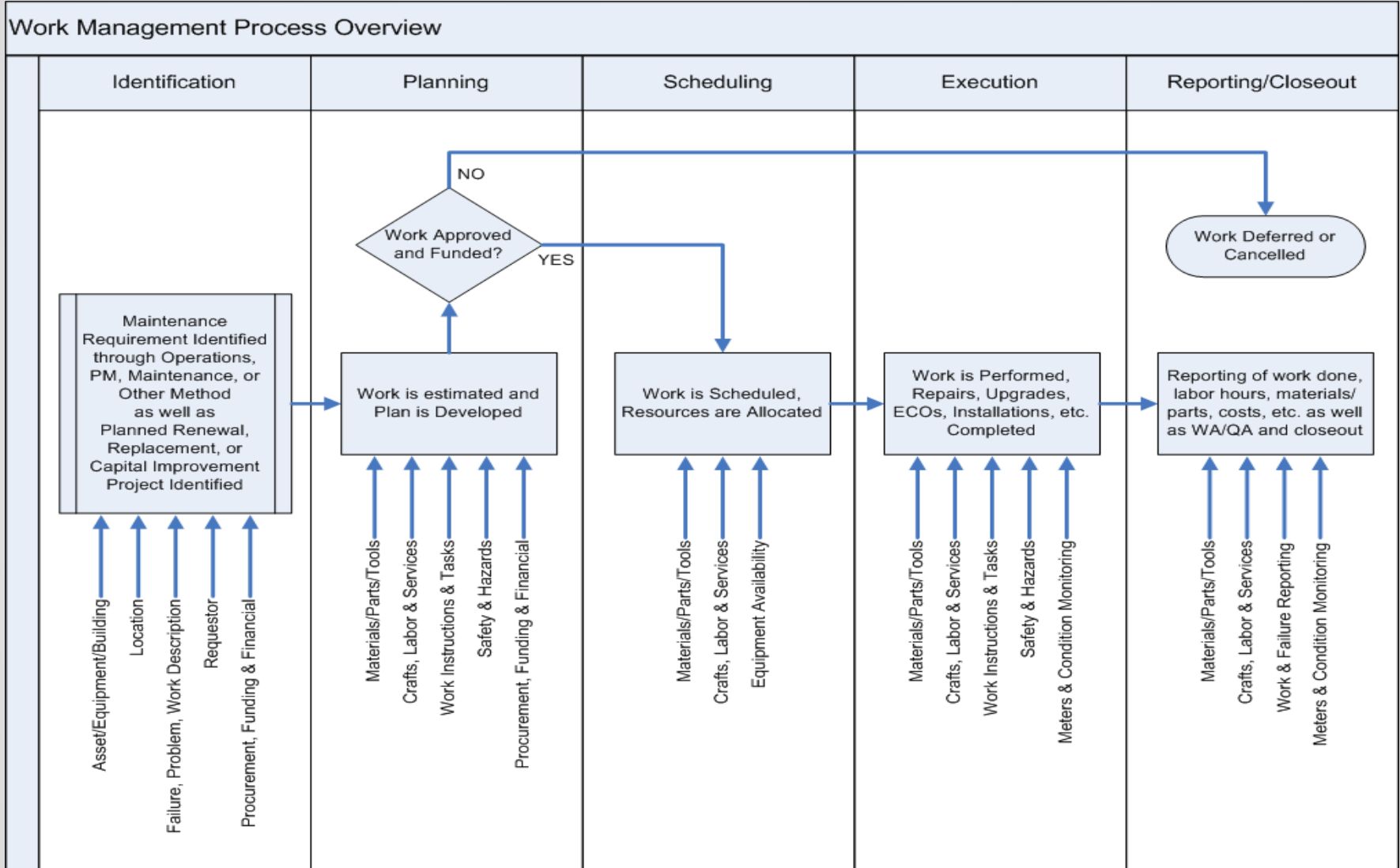*Don Linn, P.E., Cincinnati MSD:*
"… Through effective PM and predictive data we are pushing back replacement by at least 5 years or 25% greater useful life. I predict we will be capable of deferring replacement … as we continue to maintain this equipment effectively. This is a deferred savings of about $6,000,000 on this alone."

Plan

Design

Build

Operate

Maintain

Renew

Not a System You Can Buy *– A business discipline and culture that is enabled By People, Processes, Data, Technology , and Results*

Work Management Best Practice Process Flow

Work Management Process Overview

Identification	Planning	Scheduling	Execution	Reporting/Closeout
Maintenance Requirement Identified through Operations, PM, Maintenance, or Other Method as well as Planned Renewal, Replacement, or Capital Improvement Project Identified	Work is estimated and Plan is Developed	Work is Scheduled, Resources are Allocated	Work is Performed, Repairs, Upgrades, ECOs, Installations, etc. Completed	Reporting of work done, labor hours, materials/ parts, costs, etc. as well as WA/QA and closeout

Work Approved and Funded? — NO → Work Deferred or Cancelled

Identification inputs: Asset/Equipment/Building; Location; Failure, Problem, Work Description; Requestor; Procurement, Funding & Financial

Planning inputs: Materials/Parts/Tools; Crafts, Labor & Services; Work Instructions & Tasks; Safety & Hazards; Procurement, Funding & Financial

Scheduling inputs: Materials/Parts/Tools; Crafts, Labor & Services; Equipment Availability

Execution inputs: Materials/Parts/Tools; Crafts, Labor & Services; Work Instructions & Tasks; Safety & Hazards; Meters & Condition Monitoring

Reporting/Closeout inputs: Materials/Parts/Tools; Crafts, Labor & Services; Work & Failure Reporting; Meters & Condition Monitoring

Work Management Process and Maximo

Phase	Process	Maximo
Identification *"Identify Work"*	Create Service Request/ Work Order	Asset, Location, Failure Hierarchy
Planning *"Identify Resources"*	Scope Work, Estimate, Create Resource Plan	Work/Job Plan, Labor/Craft, Item/Inventory, Tools, Safety
Scheduling *"Allocate Resources"*	Manage Availability & Backlog, 4-Week Schedule	Work Order(status/dates), Calendar, Scheduling Tool
Execution *"Utilize Resources"*	Assign Work, Coordinate Resources, Monitor Progress	Work Order, Communication Log, Assignment Tool
Reporting & Closeout	Record Work Done, Resources Used, Follow-up	Work Reporting, Timekeeping, Logs, Follow-Up WO/SR

Maintenance Planning
"What do you mean I need to think ahead?"

Maintenance Planning – "Identifying Resources"

Planner Activities

1. *Work Screening*

2. *Job Research*

3. *Task & Resource Planning*

4. *Work Package Creation*
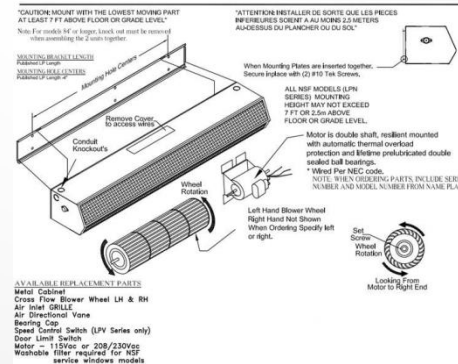
Maintenance Planning – "Identifying Resources"

Planner Activities

1. *Work Screening – The Planner reviews new Service Requests & Work Orders to validate information necessary to plan work:*

   - Correct equipment number & location
   - Work description or equipment symptoms
   - Work priority
   - Failure reporting/work order classification
   - Initial safety considerations

   The Planner also reviews Maximo work orders to determine if the job has been performed previously and history is available.

   They also may search for a job plan template for the requested work and review predictive data as applicable.

Maintenance Planning – "Identifying Resources"

Planner Activities (cont.)

2. *Job Research – The Planner may visit the equipment location to field plan the work order. Work order planning at equipment location encompasses the following:*

- Observing physical restraints
- Identify environmental condition
- Identify safety issues
- Prepare field drawings or sketches
- Take digital pictures with supporting notes
- Prepare any type of notations that will help plan the job
- Specify special tools and/or equipment

About 25% of a Planner's time should be spent in the field, assessing and "scoping" maintenance work.

Maintenance Planning – "Identifying Resources"

Planner Activities (cont.)

3. *Task & Resource Planning – The Planner develops and documents the work plan using experience and/or information obtained during visit to equipment work area to create the job plan, it includes at a minimum:*

- Craft, skill level, and number of each craft needed to perform the required work.

- Spare parts and material requirements needed to complete the work order.

- Special equipment such as Fork trucks, Trailer, Cranes, Pumps/Generators, Cleaning Rigs, Welding/cutting machines, etc.

- Permits such as Confined Space, Hot Work, Scaffold/Elevated Work, Hole Watch, etc.

- Technical documentation that is needed to support the craftsperson.

Maintenance Planning – "Identifying Resources"

Planner Activities (cont.)

4. *Work Package Creation - The Planner assembles all information and documentation necessary to schedule & execute the work and when all resources are available they assign responsibility, set the priority, add any other information, and verify the plan one final time. Planners may also attach electronic documents to the Maximo work order.*

When all spare parts, materials, and other non-labor resources are known to be available, the work order is ready for scheduling.

Planning Tools – Maximo has all you need

Maximo users plan work through:

- Tasks/Sequence
- Parent/Child work orders
- Crafts & Estimated time/effort
- Materials/Parts
- Services
- Tools
- Attachments

Labor Parts

Asset Tasks

Tools Instr.

Planned Work Order

MaxAssist Tool enables this step – providing 'dynamic training guide'

Next step is highlighted on screen

MaxAssist: Dynamic "Wizards" guides User to the right field & action.
Other tools provide advanced app configuration. (No coding required)

MaxAssist is one tool in TRM's Maximo suite

Maintenance Scheduling
## *"It's not Rocket Science"*
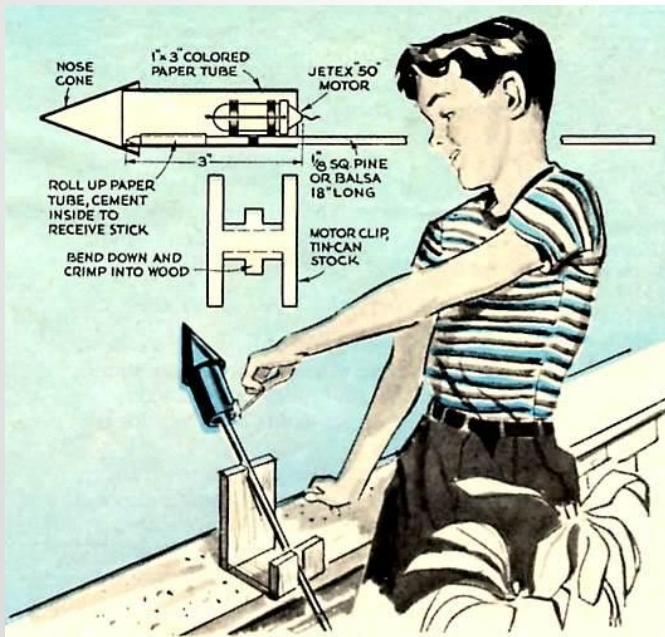
Maintenance Scheduling – "Allocating Resources"

Scheduler Activities

1. *Screening – The Scheduler reviews the work plan and makes any necessary modifications to priority, additional estimate details, and/or designation if work will be performed by a specific crew, specialty, or tradesperson.*

2. *Manage Scheduling Backlog and the 4-Week schedule.*

3. *Coordinate with Operations & Facilitate the weekly scheduling meeting.*

4. *Support Supervisors/Leads with executing the schedule.*

The 4-Week Schedule
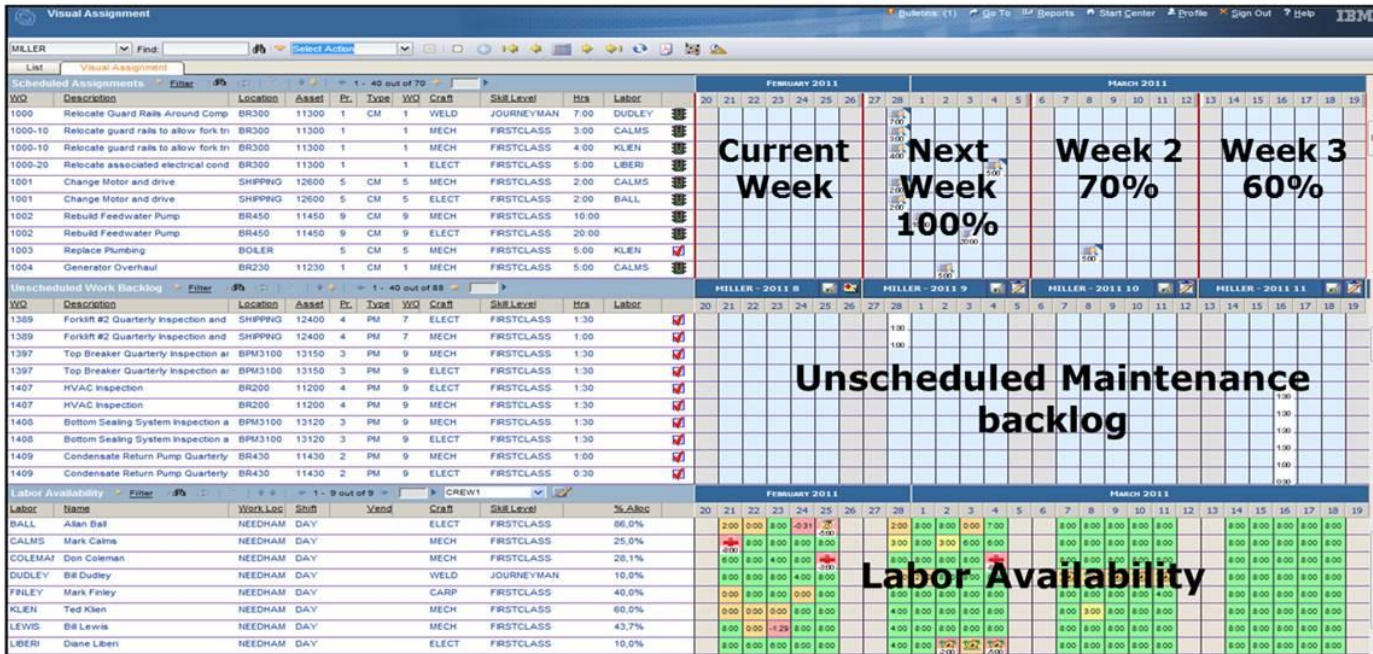
The Weekly Scheduling Meeting

- The joint scheduling meeting is attended by any/all operations, maintenance, and engineering personnel who have a need to provide inputs to the current schedule.

- Schedulers have visibility into availability of resources and will follow up with procurement, engineering, operations, contractors, etc. to ensure that work placed in the schedule will have the required resources available when needed.

- Supervisors & schedulers get together to discuss any work that needs coordination between departments, crafts, or operations.

- The Scheduler adds work orders to the next, two-weeks out, and three-weeks out schedules in the 4-Week Schedule.

The Supervisor's Role in Scheduling

- Maintenance Supervisors attend to the specifics as to who-what-where-when for the weekly schedules.
  - The Scheduler assists the Supervisor by ensuring that materials, tools, and/or services are available and communicate this information with all concerned parties in Maintenance and Operations.

- Maintenance Supervisors look after the day-to-day activities comprised in the weekly schedule. They assign Technicians in a best-fit fashion to the various Work Orders.

- They also determine the trade availability for the next, two, and three weeks out and forward that on to the Scheduler.

- Supervisors assign the work to crafts daily or weekly to execute and the scheduling process phase is complete.

Scheduling Tools

- IBM Maximo Asset Management Scheduler
  - http://www-01.ibm.com/software/tivoli/products/maximo-asset-mgmt-scheduler/

- CiM Maintenance Visual Planner Suite
  - http://cimmaintenance.com/visual-planner-suite/

- Solufy AKWIRE Visual Planning & Scheduling for Maximo
  - http://www.solufy.com/index.php/side-visualscheduler

- Pipeline Software Visual Scheduler
  - http://www.gopipeline.com/visualscheduler/

Selling Planning & Scheduling to your Organization

The Business Case for Planning & Scheduling
It's all about the bottom line, or is it?

<u>What does "old school" Management think?</u>

You go to your manager requesting to implement planned maintenance in your organization. Pre-conceived notions and misinformation compel them to respond:

"It's too expensive!"

"We can't hire more people!"

"We already have a PM program!"

"The supervisors (or leads) should be doing it!"

"We are already doing it!"

"We don't need it!"

The Business Case for Planning & Scheduling
It's all about the bottom line, or is it?

How do you respond?

Simply stated, a **10% increase in productivity** for a 50 tradesperson maintenance organization would yield approximately **9,600 more hours** to do work. **That's approximately 5 more tradespersons worth of work output!**

- Will that enable you to significantly reduce overtime?
- What could that do to your backlog?
- What initiatives could you undertake? (PM Optimization, Predictive Program, Capital or Special Projects, etc.)
- What are the secondary benefits? (operations efficiency, increased equipment availability/throughput)

The Business Case for Planning & Scheduling
It's all about the bottom line, or is it?

<u>*But wait, there's more…*</u>

Effective maintenance Planning & Scheduling conservatively results in 10-15% reduction in Inventory Expense.

- – For an organization that spends $1M per year in maintenance materials, this would yield approximately ***$100-150K savings annually!***

- – In addition, you can expect to reduce amount of inventory required to be held in the warehouse, resulting in a reduction of carrying and handling costs.

Can you afford not to implement effective Planning & Scheduling?

Roadmap to Implementing Effective Planning & Scheduling

That all sounds great, but how do we get there?

Here's How:

1. Understand where you are, where you want to go, and what benefits you can expect to achieve.
2. Develop a workable implementation plan and get management behind it.
3. Execute your plan.
4. Train and empower your people.
5. Measure progress and continuously improve.

Show management the improvement and enjoy your promotion…

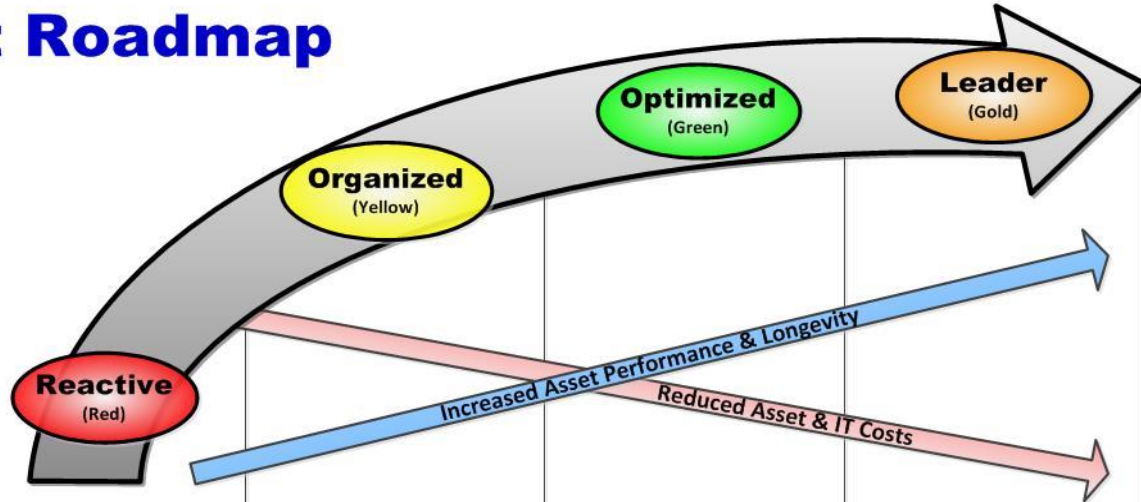## 1. Understand Your Current & Desired States, Estimate Benefits

- Perform an assessment of your current planning & scheduling practices.
  - Do you have Planners? Schedulers? Maintenance Engineers?
  - What is the current ratio of planners to tradespersons?
  - To what level are you planning & estimating work?
  - Do you maintain a 4-week schedule?
  - Do you conduct frequent planning/scheduling meetings with operations (and engineering)?
  - What is your maintenance efficiency?
  - What technology/tools do you have & are they adequate?
 - What KPI's, Metrics, Reports are you using?

total resource management
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Best Practice Planning & Scheduling is key to maintenance program maturity!

Strategic Asset Roadmap
Strategy and System

|		Reactive (Red)	Preventative	Predictive	Reliable
Strategy (Boardroom Driven)	**Strategy** (ISO 55000, IIMM...)	**Not Defined** Low visibility & linkage	**Strategic Plan** Assets linked to Business	**Robust Asset Plans** Performance, Risk, Cost...	**Performance Mgmt** Link EAM results to Plans
	Organization (People, Leadership...)	**Isolated Silos** Minimal Collaboration	**MRO focused** Maint->Matls->Ops	**Lifecycle focused** Acquisition-MRO-Finance...	**Asset Focused** Fully empowered teams
	Asset Data (Registry, Docs, GIS...)	**Notebooks** Hidden at worksite	**Visible** Solid registry, Linked Docs	**Robust** Spec Sheets, GIS enabled	**Lifecycle Capture** Asbuilts, Doc Mgmt, Linear
EAM System (Business Line Driven)	**Platform** (Maximo EAM)	**Chaos** Hundreds of apps	**Plant CMMS** Localized MRO solution	**Enterprise (EAM)** Global, Lifecycle enabled	**Extensible** Enhance without coding
	Work Mgmt (Integration, Mobility...)	**Fragmented** Separate Dept tracking	**Visible** Standard process	**Tailored** Integrated, Workflow	**Optimized** Mobile & CBM enabled
	Maintenance (Labor, Materials...)	**Reactive** Minimal PM	**Preventative** PMs, Planned, Materials	**Predictive** PM/Predictive, Scheduled	**Reliable** TPM, critical asset RCM
	Acquisition (Projects, Contracts...)	**Spreadsheets** Minimal Collaboration	**Maximo Linked** View info from Maximo	**Integrated** Fully Maximo integrated	**Seamless transfer** As-builts to EAM
	Management (Reports, KPIs, Scorecard...)	**Reactive** Meetings & email	**Reporting** Key, integrated reports	**KPIs** Start Center enabled	**Scorecard** Tiered, balanced metrics
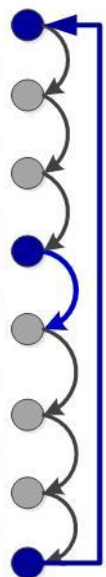
What should my ratio of supervisor, planner/scheduler, or maintenance engineer to craftsperson be?

- Supervisor to Craftspeople   1:10
- Planner/Scheduler to Craftspeople   1:20
- Maintenance Engineer to Craftspeople   1:40

1. Understand Your Current & Desired States

- *Define the desired state for your organization.*
  - Planning & Scheduling group organization, staffing, training, roles, & responsibilities.
  - Process development & standardization.
  - Technology/tool enhancement or implementation of new/additional tools.
  - Budget
  - KPI's, metrics, & reports.
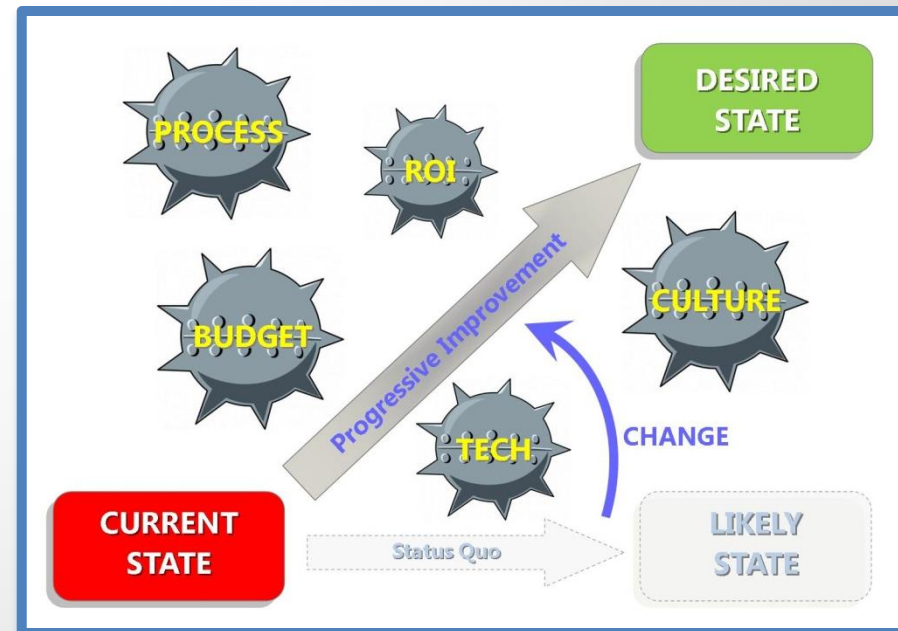
Estimate Your Benefits

- *Estimate the benefits you can expect to achieve.*
  - Complete benefits self-assessment questionnaire worksheet.
  - Implement KPIs & metrics to measure your progress.
  - Communicate results to stakeholders & management to ensure their support.

2. Develop Implementation Plan & Gain Management Support

- *Define a clear, workable implementation plan that addresses:*

  ☑ **People** - What are the organizational impacts and how will you enable change?

 ☑ **Processes** – How will you do business in the desired state and how will you get the organization there?

  ☑ **Technology** – What software & tools will you use and how will you use them?

Communicate your plan to stakeholders & management and get them to drive the ship.

3. Execute the Implementation Plan

- *Implementation Details:*
  - Form, train, and empower a planning & scheduling group.
  - Standardize business process and metrics/KPIs
  - Modify or implement technology, software, & tools to support effective planning & scheduling.
  - Roll out
  - Monitoring & continuous improvement
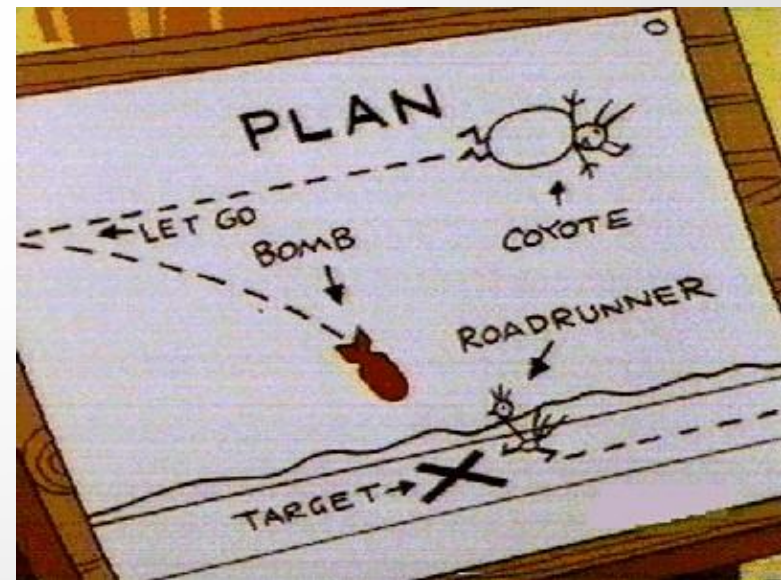
4. Train & Empower your Workforce

- *Immersion training, Planning and Scheduling 101*
  - Recommended for all Maintenance Personnel but required for Supervisors, Leads, & Planners/Schedulers
  - Introduction & Overview of Planning & Scheduling
- *Advanced Planning & Scheduling*
  - Required for Planners/Schedulers & Supervisors, leads recommended
  - Hands-on Functional and Technical "How-to" Training for planning & scheduling work, backlog, and managing the 4-week schedule
- *Ongoing mentoring and skills development*
  - Follow-up workshops & seminars for Planners/Schedulers, & Supervisors

5. Measure your progress to continuously improve

- *Institute actionable, realistic metrics & KPIs to measure progress and identify needs for focused improvement*
  - "Metrics" is a collective term used to categorize reports, charts, graphs, etc. intended to measure aspects of an organization's activities and performance
- *Communicate progress to stakeholders & management and facilitate action*
- *Planning & Scheduling Group plays the key role in making it happen*

Planning & Scheduling Metrics/KPIs

Key Performance Indicators – Work Planning

Name	Description	Definition	Benchmark Value	Current Value (if available)	Targeted Goal/ Timeframe
Percentage of Planned Maintenance	What percentage of completed work orders were planned	Count of planned work orders divided by count of all work orders	> 85%	Not available	TBD
Planning Effectiveness	Difference between planned work hours and actual hours spent to complete work	Total hours planned divided by total maintenance hours	+/- 10%	Not available	TBD
Ratio of Planned & Scheduled Maintenance	Ratio of Planned & Scheduled Maintenance to total hours worked	Total hours of planned & scheduled work divided by total hours	85-95%	Not Available	TBD

Key Performance Indicators – Work Scheduling

Name	Description	Definition	Benchmark Value	Current Value (if available)	Targeted Goal/ Timeframe
Schedule Compliance*	Ratio of work completed to work scheduled	Work Completed divided by work scheduled	> 90%, Upward trend	Not Available	TBD
PM Schedule Compliance*	Ratio of PMs completed to PMs scheduled	PM work Completed divided by PM work scheduled	> 95%, Upward trend	Not Available	TBD
Scheduling Effectiveness	Difference between weekly hours scheduled for work and actual hours taken to complete work	Actual work hours divided by scheduled hours (weekly)	+/- 10%	Not Available	TBD

* Schedule compliance metric needs to take into account minimum schedule or total availability to discourage schedule manipulation to boost compliance numbers, initially the weekly schedule should leave 10-15% of available time free to handle emergencies or schedule injections

TRM Planning & Scheduling Benefits Estimator

Maintenance Planning & Scheduling Benefits Estimator

ID	Assessment Item	Number/ Count/ Hours/%	Cost/Amount	Average Hourly Burdened Rate
1	Most recent fiscal year annual Maintenance budget, including maintenance labor (regular and overtime), materials/parts, and maintenance contractors?			
2	Most recent full fiscal year total maintenance cost/expense including maintenance labor (regular and overtime), materials/parts, and maintenance contractors/services? *(should equal sum of 2a, 2b, 2c, 2d)*			
2a	Total cost/expense for regular maintenance labor?			
2b	Total cost/expense for overtime maintenance labor?			
2c	Total cost/expense for maintenance materials/parts?			
2d	Total cost/expense for maintenance contractors/services?			
3	Most recent full fiscal year total callout/call-in hours (or cost)? (Callout/Call-in is when a maintenance worker is "called-out/in" from home to resolve a failure/maintenance item outside of normal work hours, usually at a premium rate)			
4	Number of maintenance mechanics/technicians in each division/department or craft and Average Hourly Burdened Rate per Craft?			
4a	Div/Dept/Craft 1:			
4b	Div/Dept/Craft 2:			

"Mr. Osborne, may I be excused? My brain is full."

Closing Remarks, Questions?

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