



With our experience, knowledge, and expertise, we're more than just a great way to measure effectiveness, maintain excellence, and identify opportunities for improvement.

We're like money in the bank.

Achieving Maintenance Excellence

Achieving multi-million dollar results does not need to cost millions of dollars in consulting fees.

It just takes a focused effort by experienced Carmagen engineers – engineers who have done this before and know how to achieve maximum results from your investment.

An Approach to Becoming Competitive

- 🏢 Assessing maintenance effectiveness
 - ⇒ Define parameters to measure effectiveness
 - ⇒ Identify organizational barriers which exist
 - ⇒ Establish the incentives for change
 - ⇒ Pinpoint the procedures which need to be upgraded
- 🏢 Benchmarking the competition
 - ⇒ Cost indices
 - ⇒ Reliability parameters
 - ⇒ T/A performance
 - ⇒ Routine maintenance prioritization
 - ⇒ Overtime performance
- 🏢 Establishing improvement objectives
 - ⇒ Select long term and annual improvement targets and simple measures of success
 - ⇒ Define the organizational and procedural improvements required
 - ⇒ Develop a plan to achieve maintenance excellence
 - ⇒ Implement actions and follow-up

All the right people in all the right places.™

CARMAGEN
Engineering, Inc.



Carmagen Engineering's Role

- 🏭 Conduct an initial assessment of your current maintenance effectiveness
 - ⇒ Estimate your competitive position
 - ⇒ Define preliminary opportunities for improvement
 - ⇒ Identify highest pay-out organizational and procedural changes
- 🏭 Work with your personnel to develop alignment for action plans to implement improvement
 - ⇒ Establish priority action plans
 - ⇒ Define resource requirements
 - ⇒ Develop timelines and milestones
- 🏭 Assist with training/implementation of selected improvements, for example:
 - ⇒ Organizational communication and team building
 - ⇒ Redefining roles/responsibilities
 - ⇒ Developing improved procedures
 - ~ Budgeting
 - ~ Daily work prioritization
 - ~ T/A planning

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Engineering, Inc.

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DO YOU WANT TO REDUCE MAINTENANCE AND IMPROVE RELIABILITY?

Introducing Carmagen Reliability and Maintenance Programs

Which statement best characterizes your primary objective?

- A. Reduce Maintenance Costs
- B. Reduce Downtime by Shortening the Duration of Turnarounds
- C. Extend Run Length Between Shutdowns and Turnarounds
- D. All of the Above

If you answered yes to any of the above, you should contact Carmagen for our unique three pronged approach to reduce maintenance costs and improve reliability. Choose any one or all three programs.



Carmagen Engineering – Where Experience Counts

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1 MAINTENANCE MANAGEMENT

Certain decisions have a measurable impact on both plant maintenance costs and reliability in any plant. Carmagen Engineering, Inc. (CEI) prides itself on its ability to help your staff identify those vital few decisions and implement strategic changes, while retaining focus on necessary day-to-day tactical tasks. We can help you and your staff to:

- Assess overall maintenance effectiveness
- Incorporate the best features of industry practices into your operations
- Define and achieve specific improvement objectives for reliability and maintenance in both organizational design and procedures

Areas of Focus:

- Maintenance Philosophy
- Goals and Objectives
- Work Planning and Scheduling
- Staffing and Contract Control
- Maintenance Work Procedures
- Technical Support and Training
- Organization Design
- Safety
- Proactive Maintenance
- Budget and Cost Control
- Process Operations

CEI professionals can help you identify weaknesses in your current maintenance practices and introduce you to the Best Practices used by world-class organizations. Implementation will reduce maintenance costs and improve reliability. While some recommendations will require minimal effort and yield immediate savings, others will take longer to implement. CEI maintenance professionals will guide you through each step.

| | |
|----------------------------|---|
| Typical Application | Program scope, team composition (joint CEI and refinery staffing), duration, cost and benefits vary to match a client's needs and opportunities. An example application of Maintenance Management for a medium-size refinery can be characterized as follows: |
| Team Composition | A team of 2 – 4 experienced maintenance professionals will collaborate with your staff to evaluate your maintenance practices, identify opportunity areas, and prepare a plan for eliminating roadblocks to improvement. |
| Duration | Preparation: ~ 2 – 4 Weeks On-site Program: ~ 2 Weeks |
| Benefits | 15 – 30% reduction in maintenance costs |

2 TURNAROUND MANAGEMENT

Carmagen Engineering, Inc. (CEI) has been highly successful helping its clients plan and execute effective turnarounds. The relatively small cost of our services was repaid many times over in tangible savings. While some practitioners merely focus on the nuts and bolts details, the CEI strategic program can reveal often neglected yet essential keys to success, such as:

- Management's role in clarifying competing objectives and monitoring T/A results
- Alignment among divisions and departments to achieve mutually agreed T/A goals
- Effective procedures for screening, planning, budgeting, and scheduling T/A work

Assess Current Effectiveness:

- Define Key Performance Measures for T/As
- Identify Organizational Barriers
- Estimate Anticipated Improvement Incentives
- Pinpoint Major Areas of Opportunity

Benchmark the Competition:

- Cost and Schedule Indices
- Run Length Predictability
- T/A Planning Milestones
- Accuracy for Predicting Work
- Critical Path Optimization

Develop Implementation Plan:

- Assemble T/A Milestone Plans Matching Pacesetters
- Define Action Steps and Assign Responsibilities
- Estimate Costs and Resources Required
- Identify Training Needs
- Build Communication Plan and Reporting Protocols
- Compile Implementation Schedule

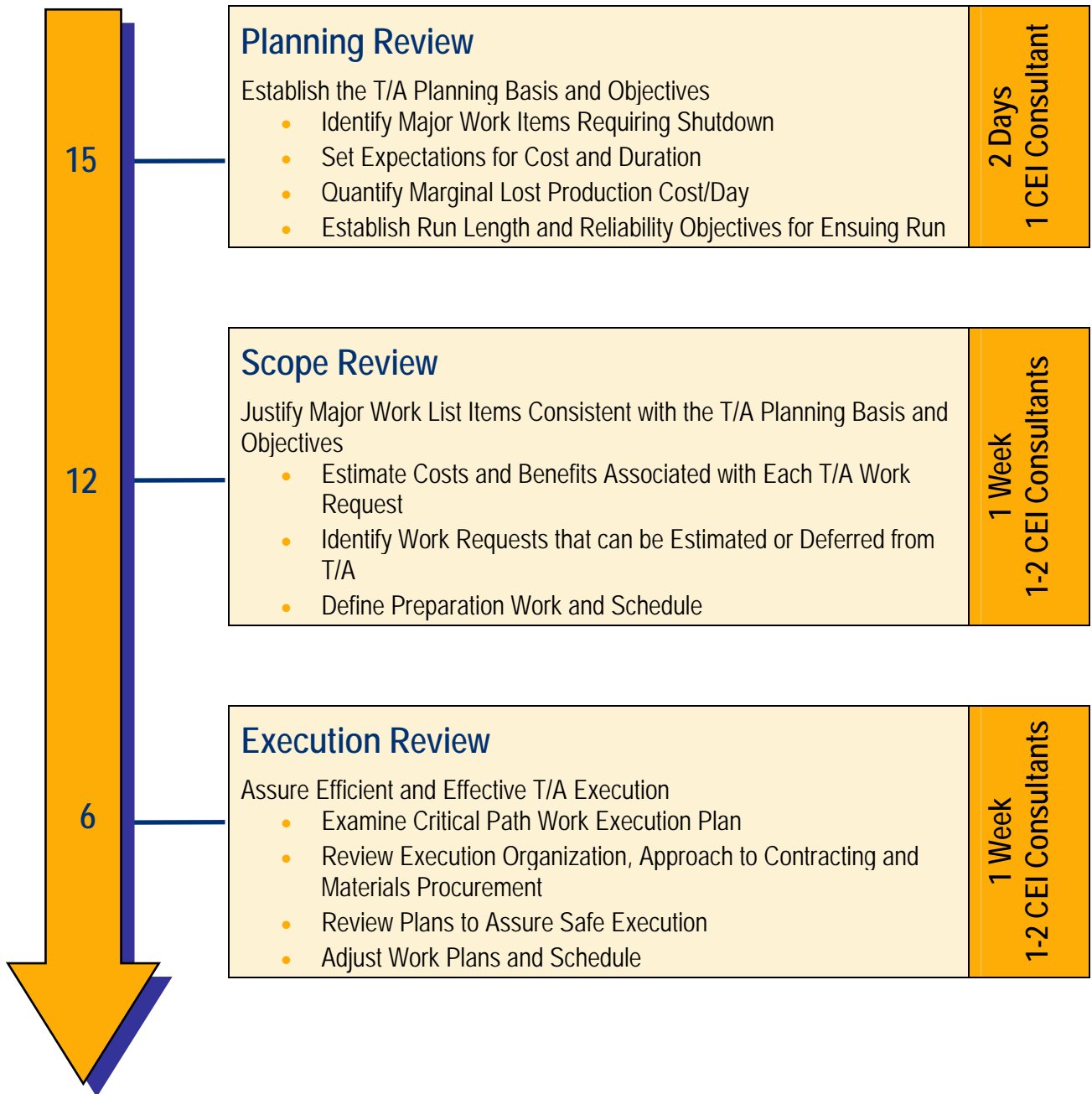
| | |
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| Typical Application | Program scope, team composition (joint CEI and Refinery staffing), duration, cost and benefits vary to match a client's needs and opportunities. An example application of Turnaround Management for a medium-size refinery can be characterized as follows: |
| Team Composition | A team of 2 – 3 experienced maintenance professionals will collaborate with your staff to examine your turnaround practices, identify areas for improvement, and prepare a plan for eliminating roadblocks to improvement. |
| Duration | On-site Program: 1 – 2 Weeks |
| Benefits | Up to 2 year increase between T/As and 1 – 2% higher plant availability |

3

TURNAROUND EXCELLENCE

Invite a Carmagen Engineering, Inc. (CEI) Maintenance Professional into your plant to show you how to reduce the cost and duration of your next Turnaround. Alternatively, combine Turnaround Excellence with the strategic Turnaround Management program to continue improving the efficiency and effectiveness of all your future Turnarounds.

Months to T/A



INTRODUCING CARMAGEN RELIABILITY AND MAINTENANCE PROGRAMS

1 Maintenance Management

Strategic initiative for improving a refinery's ability to manage all aspects of Maintenance by:

- A. Identifying major improvement opportunities
- B. Quantifying opportunities through Benchmarking
- C. Recommending Best Practices to close gaps
- D. Removing barriers that could impede implementation

Components

- Leadership
- Organization Design
- Performance Measurement and Analysis
- Goal and Target Setting
- Effective Maintenance Planning
- Efficient Maintenance Execution

2 Turnaround Management

Focused slice of Maintenance Management enabling a refinery to continuously improve performance in all future Turnarounds

Deliverables

T/A Best Practices

3 Turnaround Excellence

Focused slice of Maintenance Management enabling a refinery to continuously improve performance in all future Turnarounds

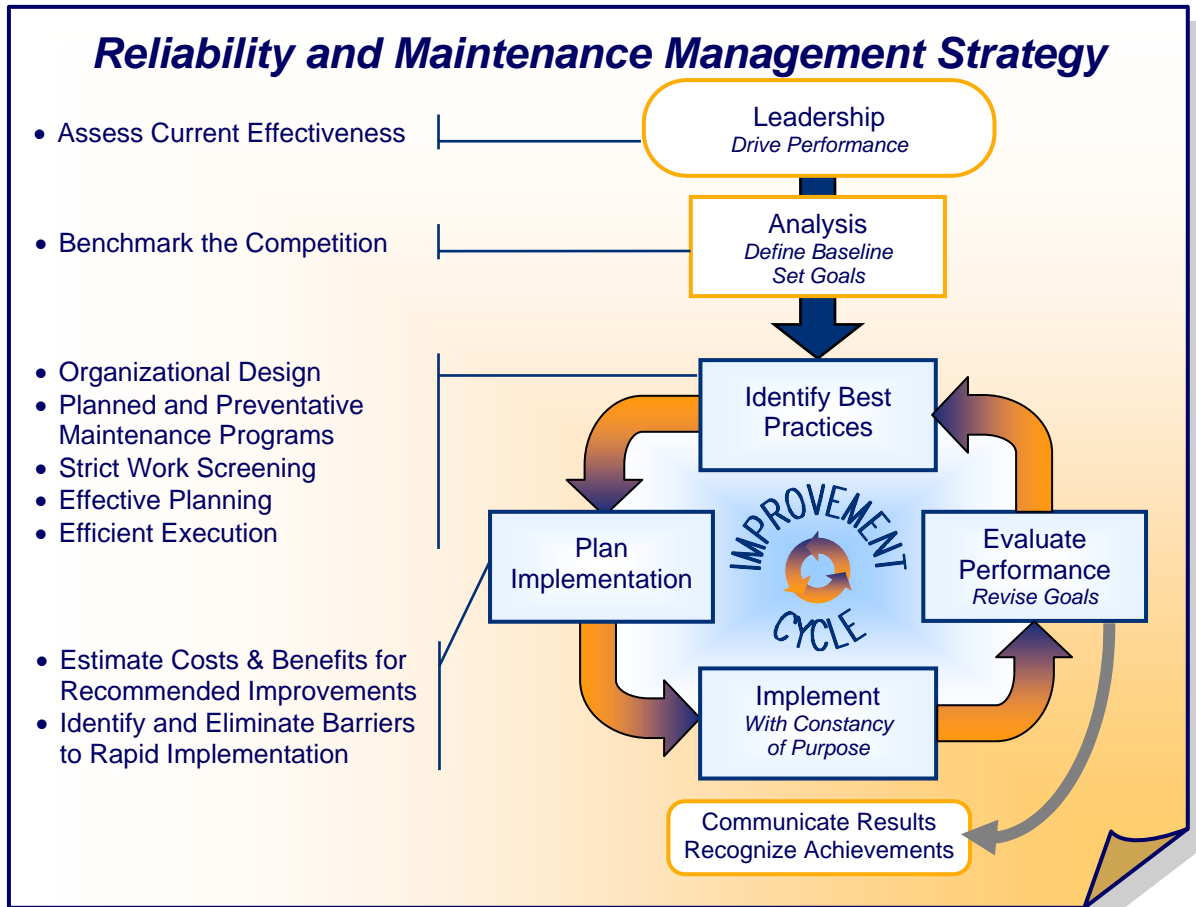
Three Key Steps

- Planning Review to clarify objectives
- Scope Review to eliminate unnecessary work
- Execution Review for speed and efficiency



IT'S YOUR CHOICE

Take advantage of Maintenance Management to improve your entire maintenance program or choose Turnaround Management to focus attention on these intensive high profile events. Alternatively, choose both programs to tap into the full spectrum of CEI maintenance expertise.



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