

# What you need to know to prepare for the CMRP Exam

By Ricky Smith CMRP, CMRT



# Text me...

1. Are you planning to take the CMRP in this year or next?
2. Are you a member of SMRP?
3. Why are you taking the CMRP Exam?

# CMRP Exam Questions

1. Which one of the following is generally true?
  - a. Construction contractors are usually equally skilled at performing all maintenance tasks
  - b. Maintenance is often reduced through project designs that provide in-place spares for all rotating equipment and heat exchangers
  - c. Reliability Centered Maintenance can be applied on capital projects in the pre-construction stage to determine the maintenance plan
  - d. Most mechanics can easily alternate between doing capital project work and doing equipment diagnosis and repair work
2. What are the three most significant constraints when developing a Maintenance and Reliability organization?
  - a. Culture / People / Resources
  - b. Budget / Operations / People
  - c. Engineering / Human Resources / Budget
  - d. Culture / Engineering / Budget
3. Weibull (life data) analysis is primarily used for:
  - a. Maintainability analysis
  - b. Probability of failure determination
  - c. Life-cycle cost analysis
  - d. On time ratio calculations

Item	Key
1	C
2	A
3	B

# CMRP Exam Questions, cont.

4. A large manufacturing company installed some asset monitoring device on some large motors that were deemed critical equipment. The monitoring devices provide engineering with vibration data, acoustic data, as well as operational performance data. What asset management strategy has the company selected for the motors?
- a. OBM (Operational Based Maintenance/CM (Corrective Maintenance)
  - b. PM (Preventive Maintenance/OBM Operator Based Maintenance)
  - c. CBM (Conditioned Based Maintenance)/PDM (Predictive Maintenance)
  - d. CBM (Condition Based Maintenance/CM (Corrective Maintenance)
5. If a machine is run for 500 hours and five failures are observed during this period, what is the Mean Time Between Failure?
- a. 500 hours
  - b. 0.01 hours
  - c. 2500 hours
  - d. 100 hours
6. Which of the following most effectively makes up the members of a Manufacturing Team?
- a. Sales/Customer/Production/Supplier/Senior Management
  - b. Maintenance/Engineering/Production/Human Resources
  - c. Production/Maintenance/Supplier/Engineering
  - d. Senior Management/Production/Human Resource

4	C
5	D
6	C

# CMRP Exam Questions, cont.

7. A skills audit is undertaken to:
- Help an organization understand skills in its industry.
  - Help an organization understand skills it requires.
  - Benchmark skills against other companies.
  - Develop employee training plans for the next year.
8. Of the following, what is the best method for measuring employee skills and training?
- Maintain a skills inventory and tracking database
  - Ask employees to keep a training notebook
  - Keep records of all formal training courses taken
  - Have employees complete annual self-evaluations
9. When training maintenance workers, it is best to first:
- List all the tasks the workers need to perform
  - Check the budget to set how much to spend per worker
  - Review the list of classes already taken by the workers
  - Give classes to all workers on basic skills
10. What relationship should Maintenance and Reliability Teams have with customers and suppliers for optimum effectiveness?
- Purchasing should be the only communicators with suppliers
  - Management should be the only communicators with customers and suppliers
  - Team members should be involved in communicating with customers and suppliers
  - Sales should be the only department communicating with customers.

7	B
8	A
9	A
10	C

# CMRP Exam Questions, cont.

11. Which of the following metrics definitions is not accurate?

- a. Uptime - % of time you run producing quality product at design rate
- b. Schedule compliance - how often mechanics are pulled off their current work to another task
- c. MTBF - a measure or indicator of equipment life expectancy
- d. Backlog - how long it takes to fix broken equipment

12. Which of the following does not support people development?

- a. Providing feedback only when asked
- b. Defining result areas, goals, and measurements
- c. Coaching, feedback, and encouragement
- d. Defining training and skills goals

13. From the following list, which is not a critical structural element of a strategic plan for maintenance and reliability?

- a. Current levels of performance
- b. Benefits available through implementation
- c. Historical direction of the business
- d. Vision of the future state

14. Which performance result best shows a maintenance and reliability manager that the scheduled maintenance activities being implemented are effective?

- a. Hours spent on unscheduled maintenance have decreased
- b. Maintenance cost per unit of production has decreased
- c. Total annual maintenance cost has decreased
- d. Production rate has increased

11	D
12	A
13	C
14	A
15	C

# Who and What is the Society for Maintenance and Reliability Professionals ?

As a nonprofit organization created by practitioners for practitioners, SMRP remains committed to conducting business with a member focus. SMRP develops and implements a multi-year strategic plan directly aligned with the organization's mission, vision and values.

Mission, Vision, ValuesAs a nonprofit organization created by practitioners for practitioners, SMRP remains committed to conducting business with a member focus. SMRP develops and implements a multi-year strategic plan directly aligned with the organization's mission, vision and values.

## Our Mission

To develop and promote excellence in maintenance, reliability and physical asset management.

## Our Vision

To be the global leader for the maintenance, reliability and physical asset management profession.

## Our Values

SMRP values data-driven excellence, sharing/collaboration, membership focus, continuous improvement, accountability, trust and respect, integrity and social responsibility.

# History of the Society for Maintenance and Reliability Professionals

## “SMRP”

In 1992, practitioners from 18 different companies created the Society for Maintenance & Reliability Professionals (SMRP) to actively promote maintenance and reliability within their field and to the public.

John Day - Alcoa Mt Holly, one of the founding members – 1 of 3 plants with Maintenance Depts. in the world certified as “World Class Maintenance “.

Following the successful launch of the society, the inaugural SMRP Annual Conference took place in 1993 in Nashville, Tennessee. The event brought together practitioners to network, exchange ideas and learn about the latest tools and technologies.

In 1997, SMRP members identified a need for a certification to validate the skills and knowledge of practitioners. Members began developing the Certified Maintenance & Reliability Professional (CMRP) certification to serve as a benchmark for maintenance and reliability best practices.

Three years later, the first CMRP exam was administered at the annual conference in Cleveland, Ohio, laying the preliminary groundwork for a recognized certification program.

The CMRP has since been accredited by the American National Standards Institute (ANSI).

In 2004, SMRP formed the Body of Knowledge (BoK) Directorate – a group of members dedicated to maintaining a robust library of information and tools. The library has grown to include hundreds of documents, technical papers and presentations on best practices.

Recently, SMRP updated its mission and vision statements to include physical asset management to represent members that are involved with the lifecycle of physical assets in facilities. SMRP’s reach has expanded to over 60 countries across six continents.

Membership has grown to over 7,000 individuals, and there are more than 5,000 CMRP, CMRT and CAMA-certified practitioners worldwide. The annual conference now attracts over 1,000 attendees.

SMRP is the premier provider of educational opportunities, networking events and resources for maintenance, reliability and physical asset management professionals.



# Reasons Why You should Join the SMRP

## “Society for Maintenance and Reliability Professionals”

- The Society for Maintenance & Reliability Professionals (SMRP) is a nonprofit professional society formed by practitioners to develop and promote excellence in maintenance, reliability and physical asset management while creating leaders in the profession.
- Improving the profession requires a standard of excellence and an incentive to attain the standard. Maintenance and reliability managers are often promoted because of technical skills, without regard for their ability to improve work processes, create change, or manage people.
- SMRP believes that maintenance and reliability practitioners need greater stature and credibility in their organizations and industry to be heard. We believe the message of Maintenance and Reliability adding value is often drowned out by day-to-day production demands.
- So Why Join SMRP? (I ask this question all the time – 3 main reasons)
- **Reason #1** - To network with practitioners and professionals in maintenance, reliability and physical asset management and knowledge and resources typically found outside of your team, facility or workplace.
- The Society for Maintenance & Reliability Professionals (SMRP) offers individuals and companies the opportunity to learn, network and certify with other members from around the globe in order to develop skills and promote excellence within the profession.
- Full individual or company membership with SMRP includes:
  - ☐ Access to more than 6,500 members from around the globe with knowledge and experience in the profession
  - ☐ The SMRP Library, which houses hundreds of best practices, guidelines, metrics, presentations and recorded webinars
  - ☐ Discounted registration for SMRP-hosted events and SMRPCO certification exams
  - ☐ Volunteer opportunities to help other members and advocate on behalf of the profession
  - ☐ Opportunities to meet and network with other members through chapters and the SMRP Exchange

# Reasons Why You should Join the SMRP, cont.

## Reason #2: To Network with Professionals who have overcome challenges one faces in Maintenance and Reliability in local Chapters

### Chapters

Chapters are comprised of SMRP members who seek to connect with other professionals based on their location. These extensions of SMRP provide opportunities for members to share ideas, network and host events that attract other professionals from the area. Many of our chapters hold annual conferences or workshops that drive the growth of SMRP membership and encourage professionals and practitioners to engage with others.



Any questions regarding chapters can be emailed to [chapters@smrp.org](mailto:chapters@smrp.org). Connect with and learn more about SMRP chapters through their communities pages below, in our online community platform, [SMRP Exchange](#).

### Current Chapters

Alabama	East Tennessee	Kansas City	South Central
Allegheny/ Appalachian	Florida	Middle Tennessee	Trinidad
Arizona	Georgia	Nebraska/Iowa	Wichita
Carolinas	Grt. Cincy/N. KY	North Texas	Wisconsin
Chicagoland	Houston	Ontario	
Rocky Mountain	Indiana	SE Virginia	

# Reasons Why You should Join the SMRP, cont.

“Society for Maintenance and Reliability Professionals”

**Reason #3:** To Become a CMRP or CMRT and feel a sense of pride as a true Maintenance and Reliability Professional  
The Certified Maintenance & Reliability Professional (CMRP) program is the leading credential for validating the knowledge, skills and abilities of maintenance, reliability and physical asset management professionals.

It is the only accredited certification following the ISO standards for individuals in maintenance, reliability and physical asset management.

The exam tests real-world knowledge, including work management and leadership skills, to give individuals the tools to take the next step in their careers.

## **Why you should certify:**

1. Many employers use the CMRP / CMRT certification as a prerequisite for hiring employees.
2. Four out of five CMRP-certified individuals recommend the CMRP as a means to advance an individual's career.
3. A CMRT could mean you are put at the “front of line” when applying for a new position with your organization or outside your organization.
4. The CMRP and CMRT certification complies with ISO 17024, which is accredited by American National Standards Institute (ANSI).
5. Becoming certified includes SMRP membership and access to continuing education opportunities, employment opportunities, metrics and best practices.

# Reasons Why You should Join the SMRP, cont.

**Reason #4: To Network with Professionals who have overcome challenges one faces in Maintenance and Reliability in Shared Interest Groups**

## Shared Interest Groups

SMRP Shared Interest Groups (SIGs) connect like-minded practitioners through communities that focus on specific industries and topics. Visit [SMRP Exchange](#) to learn more and join a SIG today.

- Condition Based Maintenance ←
- Mining ←
- Oil, Gas & Petrochemical ←
- Pharmaceutical & Biotech ←
- Reliability Analytics ←
- Utilities ←

# Reasons Why You should Join the SMRP, cont.

“Society for Maintenance and Reliability Professionals”

## Reason #5: More Benefits of Membership

The benefits of certification are apparent for many fields and very attractive to practitioners in many organizations. The following is a short summary of the benefits that were highlighted by practitioners who responded to the certification survey:

- Clearer direction for career development and education
- Improved visibility and recognition within your current organization
- Differentiated pay scales
- Portable job skills and knowledge between plants and companies
- Assists in job promotion
- Greater job effectiveness

**Want to Join SMRP?**

Go to [www.smrp.org](http://www.smrp.org) and begin new journey to your success. Individual Membership - \$170.00 USD per year

# Facts about the CMRP Exam

The Certified Maintenance & Reliability Professional (CMRP) program is the leading credential for certifying the knowledge, skills and abilities of maintenance, reliability and physical asset management professionals.

Even in cases where it's not required, employment candidates are often moved to the top of the list if they're CMRP certified.

It's a great way to advance your career since it shows employers, colleagues, and peers your commitment to continued education and training.

# What is the CMRP?

The Certified Maintenance & Reliability Professional (CMRP) program is the leading credential for validating the knowledge, skills and abilities of maintenance, reliability and physical asset management professionals.

There are over 5,000 CMRP- certified individuals worldwide.

Many employers use the CMRP certification as a prerequisite for hiring to ensure they bring the most talented employees onto their teams.

It is the only certification program of its kind accredited by the American National Standards Institute (ANSI), which follows the globally-recognized International Organization for Standardization (ISO) standards for its accreditation purposes.

# Why the CMRP?

Are you looking to advance your career or improve your company's bottom line?

For over 10 years, SMRP and its certifying organization, SMRPCO, have offered world-leading certification programs for maintenance, reliability and physical asset management professionals.

These certification programs provide a unique skill set by going beyond textbook knowledge and testing real-world experiences and abilities.

According to a recent survey of SMRP certificants and members:

- 72% of respondents estimate that maintenance and reliability practices saved their organizations at least \$50,000 in the last year. 37% of respondents indicated savings of at least \$1 million.
- 62% of leaders indicate that employing a CMRP or CMRT has improved their company's operational metrics.
- 45% of leaders indicate that employing a CMRP or CMRT has increased their company's ability to innovate.
- What are you waiting for? Take the next step in your career today!



# The CMRP Certification...

Is a Validation for real world knowledge and skills of practitioners and professionals.

According to a SMRPCO Certification Survey, four out of five CMRP-certified individuals would recommend the CMRP as a means to advance their careers.

Earning your certification shows employers, colleagues and peers your commitment to continuing education and training.

Many employers use the CMRP certification as a prerequisite for hiring to ensure they bring the most talented employees onto their teams.

SMRP offers continuing education opportunities such as webinars, workshops and other educational sessions that count toward recertification hours.

# Facts about the CMRP Exam?

- The CMRP Exam is 2-1/2 Hours
- There are 110 Multiple Choice Question
- Which averages out to 1.7 minutes per question



## CMRP Recommended Study Material Downloads

The collage features several documents and manuals:

- SMRP Members Only:** "MAINTENANCE AND RELIABILITY BODY OF KNOWLEDGE" and "Guide to the Maintenance & Reliability Body of Knowledge".
- SMRP Members Only:** "SMRP Best Practices 5th Edition".
- Free on Internet:** "The IAM Competences Framework The Requirements: Version 3.0 June 2014".
- SMRP Members Only:** "Global Maintenance and Reliability Indicators" and "Fitting the Pieces Together 4th Edition".
- SMRP Members Only:** "Best Practice Metrics 3rd Edition October 10, 2011".
- Free on Internet:** "GFMAM Competency Specification for an ISO 55001 Asset Management System Auditor/Assessor First Edition, Version 2 English Version".
- Free on Internet:** "ENGINEERING RELIABILITY FAULT TREES AND RELIABILITY BLOCK DIAGRAMS" by Harry G. Kwatny, Department of Mechanical Engineering & Mechanics, Drexel University.

# What does the CMRP Encompass?

The exam assesses an individual's aptitude within the five pillars of the SMRP Body of Knowledge (BoK):

1. Business & Management
2. Manufacturing Process Reliability
3. Equipment Reliability
4. Organization & Leadership
5. Work Management



- Each pillar details an area of maintenance, reliability and physical asset management that individuals should be proficient in to improve their careers.
- Several of the pillars also address technical and “people” skills that help individuals better manage relationships with colleagues.

# Answers for Questions Concerning the CMRP Exam?

1. What is the first step I need to take if I want to take and pass the CMRP Exam?
  - Go to [www.smrp.org](http://www.smrp.org) and join SMRP
2. Where do I sign up for the CMRP Exam?
  - You must apply and pay for the CMRP Exam online at SMRP Website ([www.smrp.org](http://www.smrp.org))
3. How much time do I have to complete the CMRP Exam?
  - 2-12 Hours
4. How many questions are on the CMRP Exam?
  - There are 110 Multiple Choice Question
5. How much time is that per question?
  - You have 1.7 minutes per question
6. Where can take the CMRP Exam?
  - After you register for the exam you will be provided a time and location that meets your needs
7. How long does it take to get the results?
  - Within 5 minutes as to “pass or fail”





# My Recommendations for CMRP, Part 1

One “Must” have knowledge concerning the following in order of priority:

1. Known Maintenance and Reliability Best Practices (see “CMRP Study Recommendations step 3 below”)
2. SMRP Body of Knowledge
3. SMRP Metrics Definitions
4. Global Maintenance and Reliability Indicators (SMRP)
5. The Global Forum on Maintenance and Asset Management (GFMAM) (low priority but important)
6. Institute of Asset Management Competency Framework (IAM) (low priority but important)
7. Engineering Reliability – Fault Trees and Reliability Block Diagrams by Harry Kwatny

## CMRP Study Recommendations:

Step 1 - Join SMRP ([www.smrp.org](http://www.smrp.org)) IMPORTANT FIRST STEP

Step 2 – Join one of the SMRP Chapters or Special Interest Groups and Participate, meet others and learn from each other

Step 3 – Purchase “Maintenance Best Practices” by Ramesh Gulati and “Rules of Thumb for Maintenance and Reliability Engineers” by Ricky Smith and Keith Mobley

Step 4 – Take training in “SMRP Body of Knowledge” or Maintenance and Reliability Best Practices (not a requirement)

Step 5 – Download and Study the following from SMRP Website as a member. (SMRP Body of Knowledge, SMRP Metrics, and SMRP Best Practices, Global Maintenance and Reliability Indicators )

Step 6 – Download these free documents from internet at no charge and study

- The Global Forum on Maintenance and Asset Management (GFMAM)
- Institute of Asset Management Competency Framework (IAM)
- CMRP Candidate Guide for Certification and Recertification (Free on SMRP Website, you do not have to be a member to download), CMRP example questions are in this document
- Reliability Block Diagrams by Harry G. Kwatny (search on internet – free)

# My Recommendations for CMRP, Part 2

## Learn and Have Knowledge of:

**SMRP Body of Knowledge (5 Pillars)** - Think about how you could use these Pillars in your organization to optimize asset reliability and maintainability.

### **Pillar 1: Business & Management**

This subject area describes the skills used to translate an organization's business goals into appropriate maintenance and reliability goals that support and contribute to the organization's business results.

### **Pillar 2: Manufacturing Process Reliability**

This subject area relates maintenance and reliability activities to the manufacturing process of the organization to ensure that maintenance and reliability activities improve the manufacturing process.

### **Pillar 3: Equipment Reliability**

This subject area describes two kinds of activities that apply to the equipment and processes for which the maintenance and reliability professional is accountable.

- First are those activities used to assess the current capabilities of the equipment and processes in terms of reliability, availability, maintainability, and criticality.
- Second are the activities used to select and apply the most appropriate maintenance practices so that the equipment and processes continue to deliver their intended capabilities in the safest and most cost-effective manner.

# My Recommendations for CMRP, Part 2 continues

## Learn and Have Knowledge of SMRP Body of Knowledge (continues):

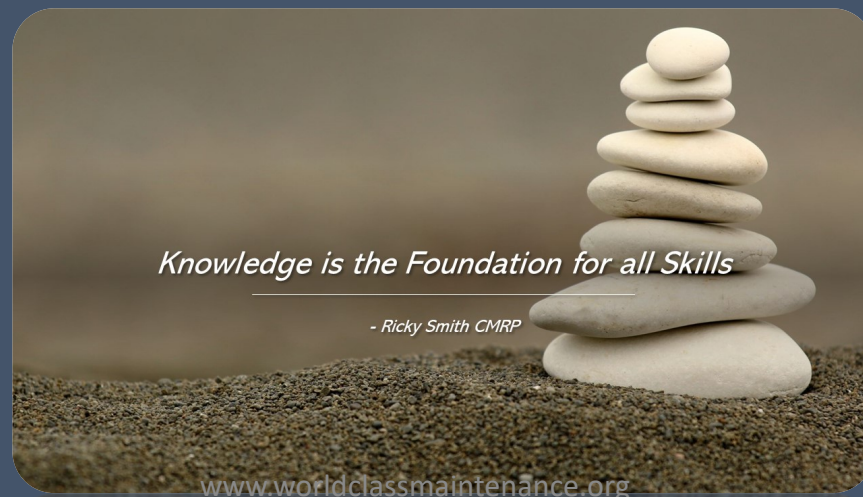
### Pillar 4: Organization & Leadership

This subject area describes processes for assuring that the maintenance and reliability staff is the most qualified and best assigned to achieve the maintenance and reliability organization goals.

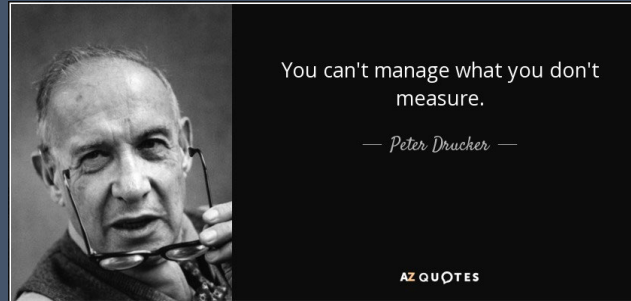
### Pillar 5: Work Management

This subject area focuses on the skills used to get the maintenance and reliability work done. It includes scheduling and planning activities, quality assurance of maintenance activities, stores and inventory management.

**Side Note: Think about how you could use the 5 Pillars to Optimize/Reshape your current Maintenance and Reliability organization.**



# My Recommendations for CMRP, Part 3



## Remember this:

- Leading Metrics lead to results
- Lagging Metrics are the results

## Learn and be able to answer questions regarding the SMRP Metrics

**SMRP Metrics** — Review the definitions found in each metric along with how they are measured and think about how one could use these metrics to optimize your current maintenance / reliability program.

**The SMRP Metrics provides** the maintenance and reliability professional the ability to do the following:

- Identify the standardization of how our maintenance and reliability practices are measured and “forms the foundation for these goals” through;
  - Measure performance consistently
  - Make valid comparison
  - Realistic expectations
  - Establish achievable goals and objectives



# My Recommendations for CMRP, Part 4

## Study SMRP Best Practices

SMRP Best Practices is a comprehensive publication of world-class metrics, guidelines and a glossary of terms for the maintenance, reliability and physical asset management profession.

This publication is designed to help practitioners run safe, cost-efficient and effective maintenance and reliability programs that align with strategic, operational and tactical best practices of an organization.

The 70+ metrics and guidelines in this new edition provide standardization and benchmarks to measure the success of maintenance and reliability programs.

Each metric is broken down by definition, objective(s), formula, component definitions and qualifications, and includes a sample calculation, best-in-class target values, cautions and notes for harmonization.

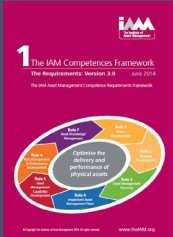
The guidelines provide additional information and further clarification of component terms used in SMRP's metrics.

# My Recommendations for CMRP, Part 5

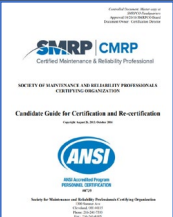
## Study These Additional Documents



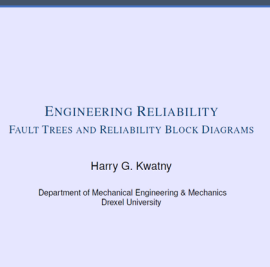
- The Global Forum on Maintenance and Asset Management (GFMAM)



- Institute of Asset Management Competency Framework (IAM)



- CMRP Candidate Guide for Certification and Recertification (Free on SMRP Website, you do not have to be a member to download), CMRP example questions are in this document



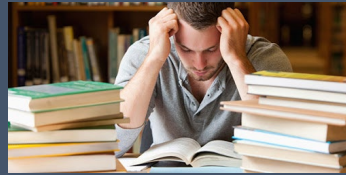
- Reliability Block Diagrams by Harry G. Kwatny (search on internet – free)

<https://worldclassmaintenance.org/cmrv-exam-recommendations>

# My Recommendations for CMRP, Part 6

Starting the week prior to the CMRP Exam:

- Study 2-4 hours every other day using the material recommended previously



- Take a 15-minute break every hour, walk around outside and clear your head, no TV while studying.



- Study with someone else is good but you will need time alone studying as well
- Get plenty of uninterrupted sleep the night prior and minimize alcohol intake (minimum of 6 hours sleep)
- Morning of the exam, eat breakfast, minimize sugar intake, take a short walk to clear your head before exam.

# Wishing you the Best

If you have questions email me at ... [rsmith@worldclassmaintenance.org](mailto:rsmith@worldclassmaintenance.org)

Organized by  
**METRIUS**



Collaboration with  
WORLD  
CLASS  
MAINTENANCE

Our instructor: Ricky Smith CMRP

Live Interactive

**MASTERCLASS**  
**Maintenance & Reliability**  
**Best Practices**  
with SMRP BOK for CMRP Exam

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Need information? [rsmith@worldclassmaintenance.org](mailto:rsmith@worldclassmaintenance.org)

