Mobius Institute ARP-E: Asset Reliability Practitioner — Reliability Engineer

Detailed Course Outline

Course Overview

Full Title	Asset Reliability Practitioner® [ARP-E]: Reliability Engineer
Level	Mid-tier / technical depth (second of three ARP levels: A → E → L)
Duration	32 hours minimum, typically delivered over 5 days (4½ days of content)
Delivery formats	Public classroom (often at CBM+RELIABILITY CONNECT conferences), virtual instructor-led, on-site (private), self-paced video/online

Audience	Industrial reliability engineers responsible for improving organizational reliability and performance, and anyone wanting in-depth knowledge of the reliability improvement process
Standards basis	Training modeled on ISO 18436-2 and ISO 18436-3; certification per ISO/IEC 17024, modeled on ISO 18436-1 (no dedicated ISO standard exists yet for reliability-personnel certification specifically)
Framework used	Mobius Institute's Asset Reliability Transformation® (ART) process
Prerequisite	None required — ARP-A is a helpful but not mandatory precursor

Certification Details

- **Exam:** 3 hours, 100 multiple-choice questions, 70% passing grade; taken online or in person on the final course day, or via Invigilated Exam Process
- **Experience requirement:** 24 months of relevant work experience (including direct involvement in reliability improvement), verified by an independent person

- **Certification validity:** 3 years
- **Governing body:** Mobius Institute Board of Certification™ (MIBoC), ISO/IEC 17024-accredited
- **Pre-study:** Full "Learning Zone" video library upon registration
- **Post-study:** 4 months of continued Learning Zone access (upgradeable to 1 year); free ongoing access to Mobius CONNECT® community

---

Module-by-Module Outline

1. Introduction

- The reliability engineer vs. the reliability program leader — roles compared
- Overview of the Asset Reliability Transformation® (ART) process
- The benefits of reliability
- How reliability improvement compares to other improvement programs

2. Culture Change

- Culture change and the individual's role in it
- Getting suggestions from the workforce
- The "brown-paper" engagement process
- Motivation theory and practice

3. Training and Skills Assessment

- Why people need training
- Conducting a skills assessment
- Training and certification pathways

4. Risk and Consequences

- Assessing risk
- Developing a consequence-ranking system

5. Likelihood and Detectability

- Estimating the likelihood of failure
- Assessing whether failure will be detected in advance

6. Reliability Data Analysis

- Importance and value of data; the foundation of reliability engineering
- Statistical techniques
- Weibull distribution analysis
- Duane model and Crow-AMSAA
- Reliability Block Diagrams (RBDs)
- Using reliability data for decision-making
- Data quality considerations
- Introductory look at AI, machine learning, and predictive analytics

7. Asset Criticality Ranking

- Defining the criticality ranking system
- Step-by-step criticality ranking process

8. Pareto Analysis

- What Pareto analysis is
- Worked Pareto analysis example (identifying "bad actors")

9. Defect Elimination

- Defining defect elimination
- Building a defect-elimination strategy

10. Minimize Life Cycle Cost

- Life-cycle cost minimization principles
- Design for reliability (including RAMS — reliability, availability, maintainability, safety — and energy efficiency)
- Value-driven procurement
- Acceptance testing

11. Operations and Reliability

- Operator-Driven Reliability (ODR)
- Standard Operating Procedures (SOPs)
- Overall Equipment Effectiveness (OEE)

12. Asset Strategy Development

- What an asset strategy (strategic maintenance plan) is
- How to develop one
- Typical outcomes of an asset strategy

13. Master Asset List and Bill of Materials

- Building an accurate Master Asset List (MAL)
- Creating a Bill of Materials (BOM)
- Management of Change (MoC) process

14. Fault Tree Analysis (FTA)

- What FTA is and its steps
- Worked FTA example

15. Failure Modes, Effects, and Criticality Analysis (FMECA)

- What FMECA is and its steps
- Worked FMECA example

16. Reliability Centered Maintenance (RCM)

- What RCM is and its steps
- Worked RCM example

17. Preventive Maintenance Optimization (PMO)

- What PMO is
- Prerequisites and getting started

18. Root Cause (Failure) Analysis (RCA) & FRACAS

- Why and when to perform RCA
- The human factor in RCA
- RCA techniques (5-Why, Ishikawa, Kepner-Tregoe, FTA, and others)
- Using condition monitoring data in RCA
- Project management for corrective action (A3, 8D, 16J)
- The Failure Reporting, Analysis, and Corrective Action System (FRACAS)

19. Work Management

- Goals of work management
- Roles and responsibilities
- Work management flow
- Job scheduling and execution
- Closeout and feedback

20. Spares and Materials Management

- Importance of spares management
- Spares database
- Selection process and purchasing requirements
- Caring for spares; the storeroom

21. Precision Lubrication and Contamination Control

- Importance and mechanics of lubrication
- Contamination and filtration
- Storage and dispensing

22. Precision Shaft Alignment

- Introduction to shaft alignment
- Defining misalignment and its types
- Determining alignment state

23. Rotor Balancing

- What unbalance is and its causes
- Diagnosing unbalance
- Why and how to balance a rotor

24. Mechanical and Electrical Fastening

- Precision fastening principles
- Bolt torquing/tensioning
- Electrical connections

- 5S and the visual workplace (Lean / Six Sigma reliability tie-in)

25. Vibration Analysis

- Introduction to vibration analysis and sensors
- Overall level readings
- Spectra, time waveform, and phase analysis
- Rolling-element bearing fault detection
- Fluid-film bearing and rotor fault detection
- The future of vibration analysis; case studies

26. Ultrasound

- Introduction to ultrasound
- Mechanical and electrical applications

27. Oil Analysis

- New vs. used oil analysis
- Analysis technologies
- Measuring/reporting oil cleanliness
- Wear particle analysis

28. Infrared Thermography

- Introduction to infrared analysis
- Mechanical and electrical applications

29. Inspections, Performance, and NDT

- Visual inspections
- Non-Destructive Testing (NDT) methods

30. Electrical Equipment

- Power quality and electrical testing
- Partial discharge
- Induction motor testing
- Motor Current Signature Analysis (MCSA)
- Electrical Signature Analysis (ESA)
- Motor Circuit Analysis (MCA)

31. The Future of Condition Monitoring

- Emerging technologies and analytics

32. Breaking Out of Reactive Maintenance

- Escaping the reactive-maintenance "cycle of doom"

33. Continuous Improvement (Kaizen)

- Key Performance Indicators (KPIs) and maintenance metrics
- CM and reliability performance review
- Reviewing and refining program strategy

Learning Outcomes

By course completion, participants will be able to:

- **Reliability data analysis** — apply statistics, criticality ranking, Pareto analysis, and understand Weibull, Crow-AMSAA, RBDs, and Monte Carlo methods well enough to know when/why to use them (mastery of the tools themselves requires further specialized training)
- **Asset strategy development** — understand and apply FTA, RCM, FMECA, and PMO to build a defensible, risk-based maintenance plan, and evaluate whether an existing strategy or consultant's work is adequate
- **Condition monitoring** — know how a CBM program should be structured, prioritized, and resourced, across vibration, ultrasound, oil analysis, thermography, electrical testing, and NDT (technical mastery of any one technology requires dedicated CM training)
- **Lubrication management** — confidently select lubricants and control contamination
- **Precision maintenance** — recognize world-class precision fastening, alignment, and balancing practices, and communicate knowledgeably with technicians, contractors, and vendors

- **Work and spares management** — assess whether an organization's planning/scheduling and MRO practices are world-class, and advise maintenance leadership on improvements
- **Root cause failure analysis** — apply core RCA techniques (5-Why, Ishikawa, KT, FTA), understand the human-error and psychological dimensions of problem solving, and manage corrective-action projects

The course does not aim to make attendees expert practitioners in every discipline (e.g., a dedicated RCM or vibration analyst course goes deeper) — instead it builds the broad, integrated technical foundation a reliability engineer needs to design, direct, and evaluate a reliability program end-to-end.

Where ARP-E Fits in the Certification Pathway

Level	Focus	Typical Audience
ARP-A (Reliability Advocate)	Big-picture awareness, culture, and process	Anyone new to reliability; managers, cross-functional stakeholders

Level	Focus	Typical Audience
ARP-E (Reliability Engineer)	Full technical depth across the reliability discipline	Reliability/maintenance engineers driving the program
ARP-L (Reliability Program Leader)	Leading and managing the initiative	Program leaders/managers

ARP-E does not assume prior ARP-A knowledge, but completing ARP-A first makes the ARP-E material easier to absorb. ARP-E graduates who want deeper technical mastery in a specific discipline (RCM, PMO, FMECA, vibration analysis, lubrication, alignment/balancing, etc.) can follow up with Mobius's dedicated specialist courses.

Source: Mobius Institute (mobiusinstitute.com), ARP-E course page and certification guide, accessed July 2026.