This guide applies to everyone who needs to solve problems from graduates, operators, experienced technicians, planners, and engineers, to supervisors, managers, project managers and subject matter experts.
THE COMPLETE GUIDE TO ROOT CAUSE ANALYSIS SKILLS DEVELOPMENT

This guide applies to everyone who needs to solve problems from graduates, operators, experienced technicians, planners, and engineers, to supervisors, managers, project managers and subject matter experts.

SO WHAT’S THE END GOAL?
To educate and equip yourself to facilitate effective investigations so you can reduce risk and maximize the reliability and availability of your assets.

AND AFTER ALL, YOU GOTTA HAVE GREAT SKILLS.

Here’s a snapshot of the learning curve

NOW LET’S DIVE IN

RCA SKILLS DEVELOPMENT

INNOCENCE

RCA 101
UNDERSTANDING RCA FOR EFFECTIVE PROBLEM SOLVING

Start by gaining awareness of these concepts:

- What is the Apollo RCA Method
- Causes and Time Lines
- 5 Whys and Beyond
- Cause and Effect Charts
- The need for evidence
- Solution Brainstorming and Qualification
- Selecting Effective Solutions

AWARENESS

RCA 201
USING APOLLO RCA TO FACILITATE AN EFFECTIVE PROBLEM SOLVING

Next, you’ll want to understand how to:

- Create an Apollo Cause & Effect Chart
- Understand fundamental problem solving processes
- Facilitate a group in an effective problem analysis
- Common Traps in RCA analysis
- Essential Elements of Refinery Accidents
- Practical Exercises – Oil and Gas Explosions & Major Incidents

UNDERSTANDING

RCA 301
APPLYING THE RCA METHOD TO INVESTIGATE INCIDENTS

Now it’s time to hone your skills in RCA, including:

- Benefits of Incident Investigation
- Role and qualification of an Investigator
- Selecting a team for the investigation
- Data collection at site
- Interview techniques
- Incident causal analysis
- Cause & Effect chart production
- Reporting including recommended solutions

COMPETENCE

RCA 401
FACILITATING RCA INCIDENTS

You’re ready to learn the intricacies of facilitation:

- Critical Elements of Successful Facilitation
- Facilitation and Interviewing
- Managing Incidents
- Apollo RCA and Six Sigma
- Apollo RCA and Human Error
- Essential Elements of Managing a Root Cause Analysis Program
- Databases and Tracking Actions
- Analysing Systemic Causes

EXPERT

RCA 501
ADVANCED SKILLS WITH APOLLO RCA - FOR REFINERIES AND OIL & GAS

Let’s Dig in – We use Oil and Gas as a practical backdrop for intense RCA:

- Detailed Evidence Cataloging Methods
- Facilitation with ISO 14224 Taxonomy
- American Petroleum Institute (API) standard 581 – Failure Mechanisms
- Using Process Flow Diagrams (PFD) with RCA
- Integrating HAZOP study content with RCA

At this stage, you should be able to:

- Understand and Apply the Apollo RCA Method
- Facilitate Effective RCA Investigations
- Develop Detailed Incident Reports

AHHH... IF ONLY THEY COULD SEE ME NOW

Focus on developing your RCA skills as outlined above and you’ll really be ready to flex your Problem Solving muscles.

TO START YOUR JOURNEY, VISIT
www.apollorootcause.com

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www.apollorootcause.com
The ARMS Reliability Training Curve aligns to the professionals learning journey to be a RCA Expert. To learn more, visit our website www.apollorootcause.com
Problem Solving Skills are learned, not something we are born with. Teams of problem solvers produce better solutions than teams of people. Learn how to solve problems and support your RCA program.

Apollo Root Cause Analysis™ (ARCA) is the world’s most trained RCA method with over 100,000 team members trained worldwide. When you need to perform an RCA, having a trained team ensures the RCA methodology is utilized with the highest efficiency.

Some RCAs can take days longer than they should. With trained team members, the process is dramatically shortened, with measurable improvement in the quality of the RCA.

The student will learn to solve problems using the Apollo Methodology. It is a different way of thinking that enables us to focus on the discovery of effective solutions.

The methods and process are disarmingly simple, but need to be learned then practised so that the team member is ready to participate in ARCA in the work place.

Returning to the work place, the team member can use the Apollo method for all types of problem solving including Continuous Improvement projects.

www.apollorootcause.com
RCA 101

Course Overview

A 1 day introduction to effective problem solving and root cause analysis using the Apollo Root Cause Analysis™ Method.

This is a perfect first course in effective problem solving for anyone and a required course for anyone who participates in a Root Cause Analysis™

The students will learn how to apply ARCA to both simple systems and complex groups of systems

Course Key Learning

The students will learn the Apollo Problem Solving Methodology. They will work several instructor - led exercises that build upon each other to learn how to identify causes and to recognize the difference between actions and conditions.

The students will be exposed to a new way of thinking about a problem and learn a step by step method to solve any problem the work place can present.

Each module builds upon the progression of effective solution generation in an approach that complements the ARCA facilitator Course and its methodology.

Course Modules

• Problems types
• Problem Definition
  – What When Where
• Why “who” is not important
• Causes and Time Lines
• 5 Whys and Beyond
• Cause and Effect Charts
• The need for evidence
• Solution brainstorming
• Solution Qualification
• Selecting Effective Solutions!

Who Should Attend?

• Engineers
• Project Engineers
• LEAN Specialists
• 6 Sigma Black Belts
• Maintenance Analysts
• Maintenance
• Designers Engineers
• Safety Representatives
• Operators
• Administrators
• Maintenance trades
• Graduates

Industries

• Oil and Gas
• Mining
• Steel
• Automotive
• Energy
• Manufacturing Plant
• Repetitive Manufacturing
• Food and Beverage

Course Information

• Time: 8 Hours (1 day)
• Exam fee: Included
• Course type: In House
• Certification: n/a

Start by gaining awareness of these concepts:

• What is the Apollo RCA Method
• Causes and Time Lines
• 5 Whys and Beyond
• Cause and Effect Charts
• The need for evidence
• Solution Brainstorming and Qualification
• Selecting Effective Solutions

www.apollorootcause.com
Problem Solving is generally understood to mean overcoming some kind of difficulty, but it’s really about controlling the causes.

In this RCA course, we build upon the knowledge gained from RCA101 and include some of the required problem solving principles to facilitate an effective analysis.

This course includes a 150 page training manual and a handy reference card, as well as a copy of RealityCharting® for each student. RealityCharting® is a software tool specifically designed to quickly and efficiently capture the findings from RCA sessions electronically and disseminate report findings through the company.

In this course, effective learning goes beyond the classroom, so students are asked to complete an Apollo Cause and Effect Chart with a summary statement, using one of their own problems, and to send it to us within 30 days. We review, comment and return it to the student with an evaluation and a certificate of course completion.
RCA 201

Course Overview

The purpose of this course is to provide students with the knowledge and skills necessary to facilitate an effective problem analysis using the Apollo Root Cause Analysis™ Method.

This course is ideal for anyone whose job involves problem solving. As a minimum, all supervisors and lead personnel should take this course.

Course Key Learning

The course provides a working knowledge of the Apollo Root Cause Analysis™ (ARCA) way of thinking. This is the most popular course, and the one taught in all public seminars. It assists anyone in understanding fundamental problem solving processes and how to facilitate an effective investigation.

This course is run over 2 days during which the participants will apply everything learned to solve an exercise problem. Each student will be given the opportunity to facilitate a group in effective analysis.

Course Modules

- Problems
- Problem Definition – What When Where
- Why "who" is not important
- Causes and Time Lines
- 5 Whys and Beyond
- Cause and Effect Chart creation
- The need for evidence
- Solution brainstorming
- Solution Qualification
- Selecting Effective Solutions!
- Group Facilitation skills
- Common Traps
- Incident investigation – Program elements
- Accreditation
- Repetitive Manufacturing
- Food and Beverage

Who Should Attend?

- Engineers
- Reliability Practitioners
- Project Engineers/managers
- LEAN Specialists
- 6 Sigma Black Belts
- Maintainers
- Designers
- Safety officers
- Team leaders
- Operators
- Managers

Industries

- Oil and Gas
- Mining
- Steel
- Automotive
- Energy
- Manufacturing Plant

Course Information

- Time: 8 Hours (2 days)
- Exam fee: Included
- Course type: Public/In House
- Certification: n/a

www.apollorootcause.com
Effective Incident Investigation entails prompt collection of the facts which will allow the identification and control of the causes, and the prevention of recurrence.

In this course, we provide the knowledge required to conduct an effective investigation of workplace incidents. From first response to final report submission, every step is carefully presented utilizing a range of media.

Students will be challenged by paced exercises which proceed from securing the scene to team selection, data collection via interview techniques, data analysis and timeline creation through to causal analysis and the generation and recommendation of solutions.

Emphasis is given to building student confidence in their ability to follow a pre-defined process leading to the production of a report which has actionable recommendations.
The purpose of this course is to provide the knowledge and skills necessary to conduct a thorough incident investigation.

Course Key Learning
Incidents occur every day in a workplace. The failure of people, equipment, the environment and management systems to behave as expected cause most of these incidents. Incidents and injuries are always undesirable. Investigating incidents is important to learn what went wrong so repeat occurrences can be prevented.

In this workshop, attendees will learn why to conduct incident investigations and how to conduct investigations that get to the root causes and help prevent further incidents. The Apollo Root Cause Analysis™ method is used to solve problems in this incident investigation class.

Course Modules
• Benefits of Incident Investigation
• Role and qualification of an Investigator
• Team selection
• Data collection at site
• Interview techniques
• Incident causal analysis
• Cause & Effect chart production
• Reporting incl. recommended solutions

Who Should Attend?
• Engineers
• Reliability Practitioners
• Project Engineers/managers
• LEAN Specialists
• 6 Sigma Black Belts
• Maintainers
• Designers
• Safety officers
• Team leaders
• Operators
• Managers

Course Information
• Time: 16 Hours (2 days)
• Exam fee: Included
• Course type: In House
• Certification: n/a

Understand applying the RCA method to investigate incidents

Now it’s time to hone your skills in RCA, including:
• Benefits of Incident Investigation
• Role and qualification of an Investigator
• Selecting a team for the investigation
• Data collection at site
• Interview techniques
• Incident causal analysis
• Cause & Effect chart production
• Reporting including recommended solutions
This course prepares the student to facilitate successful investigations at a higher level and equips the student to be well on their way to becoming an expert in the Apollo Root Cause Analysis™ methodology.

This RCA course takes elements from RCA101, RCA201 and RCA 301 and teaches advanced facilitation skills as well as how to create and support a successful RCA program.

A primary objective of this course is to teach managers how to read any event report and determine if root causes and effective solutions have been found. It also explored the elements if an effective incident investigation program, to include corrective action implementation.

Students will learn how the Apollo Root Cause Analysis™ methodology helps facilitate success by providing the tools needed to analyze and solve complicated problems. It also provides companies with a consistent means of managing problems. Organisations that use Apollo find that it becomes their stable reference point for problem solving.
RCA 401
Course Overview

The purpose of this course is to improve the knowledge and skills of Apollo RCA Facilitators to increase their problem solving effectiveness and facilitation management skills.

This course is suitable for experienced facilitators who are conducting a lot of investigation and would like to fine tune their skills to become an expert in the method.

Course Key Learning
This course is for people who have previously completed the 2 day Facilitators course. The course goes beyond the Apollo Root Cause Analysis™ methodology and teaches students effective skills that help them to become expert facilitators. Students will learn practical skills that will help them to better understand the management and process of effective facilitation.

Course Modules
- Critical Elements of Successful Facilitation
- Facilitation Exercises
- Interview Exercises
- Managing Incidents
- Apollo RCA and Six Sigma
- Apollo RCA and Human Error
- Essential Elements of Managing a Root Cause Analysis Program
- RealityCharting® Exercises
- Databases and Tracking Actions
- Analysing Systemic Causes

Prerequisites
Completion of the ARCA Facilitators Course 2 Day is required, preferably at least 6mths prior.

Industries
- Oil and Gas
- Mining
- Steel
- Automotive

Who Should Attend?
- Engineers
- Reliability Practitioners
- Project Engineers/managers
- LEAN Specialists
- 6 Sigma Black Belts
- Maintainers
- Designers
- Safety officers
- Team leaders
- Operators
- Managers

Course Information
- Time: 8 Hours (1 day)
- Exam fee: Included
- Course type: In House
- Certification: n/a

www.apollorootcause.com
RCA 501
Apollo RCA for Refineries and Oil & Gas

This course is designed with API 571 failure mechanisms applicable included as specific sources of structured evidence collection for Oil and Gas or Petrochemical operations.

In this RCA course, you will gain additional exposure to typical damage mechanisms found in the petrochemical business. Different sources of knowledge; including API 571, ASME PCC-3, ISO 14224 and other sources are used to integrated the Main damage mechanisms found in typical petrochemical units.

The course assumes some prior exposure to these standards and their content, as it does not teach these fundamental concepts, only uses them in the application of RCA.

Analysis of (serious) incident root causes in industry is influenced by consideration of corrosion loops and corrosion documents as sources of evidence.

Corrosion-Related Accidents in Petroleum Refineries with video materials prepare the student for each exercise which is based on real accidents.

Short discussion with participants about the case studies; lessons learned follows each accident investigation and subsequent RCA.

www.apollorootcause.com
RCA 501

Course Overview

The purpose of this advance course is to provide RCA training for the Oil & Gas and Petrochemical Industries.

This hands-on 2 day RCA course addresses various knowledge sources including API 571, ASME PCC-3, ISO 14224.

Course Key Learning

- How to utilize the existing standards as a framework for preparation and development of a ARCA project within Oil and Gas, Refining or petro chemical operations.
- Where to find key pieces of evidence within the API framework and organization records.
- Which experts are required on your team for which processes.
- Using the Go kit

Course Modules

- System Boundaries
- Apollo review
- API 571 Overview
- ASME PCC-3 Typical Damage Mechanisms
- ISO 14224 reporting
- Case Study – Refinery Fire and Explosion
- Case Study – Poly Vinyl Explosion and Fire
- Case Study – Upstream Oil and Gas
- Case Study – Petro Chemical Process

Industries

- Oil and Gas
- Refineries
- Petro Chemical Processes
- Energy
- Manufacturing Plant
- Repetitive Manufacturing

Who Should Attend?

- Reliability Engineers
- Maintenance Analysts
- Maintenance Superintendents
- Design Engineers
- Plant Performance Engineers
- OH&S Staff
- Process Owners
- Safety Barrier Program Owners
- Oil and Gas Professionals
- Petro Chemical Process Operators

Course Information

- Time: 16 Hours (2 days)
- Exam fee: Included
- Course type: In House
- Certification: n/a

EXPERT

ADVANCED SKILLS WITH APOLLO RCA - FOR REFINERIES AND OIL & GAS

Let’s Dig in – We use Oil and Gas as a practical backdrop for intense RCA:

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- Facilitation with ISO 14224 Taxonomy
- American Petroleum Institute (API) standard 581 – Failure Mechanisms
- Using Process Flow Diagrams (PFD) with RCA
- Integrating HAZOP study content with RCA

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WHO WE WORK WITH

www.apollorootcause.com
Since 1995, ARMS Reliability has been at the forefront of proactive asset management strategies for a range of blue chip companies throughout the world.

These companies have entrusted ARMS Reliability with delivering business goals through effective asset management and improvements in operating productivity.

The a unique blend of consulting, education and software solutions, we provide a “one stop shop” service to enable our clients to make better decisions to improve Asset Reliability.

**Call to book your course today. Ask our Expert trainers to build your team a customized training career path to Expert!**

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