Chapter 01

The Impact of Troubleshooting

The Analytical and Strategic Troubleshooting System has been developed as a guideline to aircraft technicians and aircraft maintenance organizations alike. It explains methods and procedures in a system that will lead to greater efficiency of any maintenance department and improve the technician's skills set through a set process of aircraft fault troubleshooting.

By focusing in on the day-to-day operation with sound troubleshooting methodology of aircraft system faults and associated tasks, incurred costs can be often avoided or greatly reduced.

Cost reduction

The opportunity to avoid or reduce costs is often overlooked by both the operator and technicians. The complexity and dynamics of the operation, and the need to reduce individual component repair costs and battle current delays, make costs difficult to capture and prevent the day-to-day detailed actions surrounding defect rectification from taking place as effectively as they could.

This inefficiency produces repetitive defects that carve deep into the revenue stream as the incurred costs rise.

Repetitive defects increase the “No Fault Found” (NFF) costs, along with their associated incurred costs.

Aircraft maintenance is one of the expenditures that the operator can have the most direct control over, with the exception of those items that are mandated by the regulatory authorities (FAA, Transport Canada, etc.).

The methods and procedures within the Analytical and Strategic Troubleshooting System marry sound troubleshooting procedures and teamwork with supporting business processes to combat these issues.

The Analytical and Strategic Troubleshooting System both utilizes and supports the maintenance organization’s existing resources in a cohesive manner. It consolidates a maintenance organization’s efforts to
efficiently return aircraft to service. This in turn has a positive impact on aircraft reliability, providing greater customer satisfaction and increasing the availability to generate further revenue at reduced costs.

**Current troubleshooting success**

Reports show that an average of approximately 50% of all defects troubleshoot fail to identifying the root cause. This value is a direct result of searching for a fix. This usually results in multiple component changes with many components being returned from repair stations NFF with the applicable charges and incurred costs.

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Understanding the fundamental difference is the first hurdle toward effective troubleshooting.

**Return on investment (ROI)**

The Analytical and Strategic Troubleshooting System directly addresses the success rate of troubleshooting. This situation results in fewer instances of component removal and NFF components, reducing expenditures in the form of bench check charges and shipping, receiving and handling charges. Following the system in this book avoids incurred cost and reduces and/or eliminates the need for cost recovery, which itself is a cost incurred in managing the cost recovery efforts.

Figure 1-1 illustrates operational and financial impact to an operator, maintenance organization when the system is implemented. The figure also demonstrates the benefits to the individual technician.

The system further reinforces traditional troubleshooting procedures and tasks and combines them with a business process, producing an effective and efficient method of addressing system faults.

**Other benefits of implementation**

Applying the Analytical and Strategic Troubleshooting System with intermittent or repetitive faults is extremely effective in both addressing the fault and minimizing cost and down-time in doing so.

This system does not replace any manufacturers’ manuals or a computer/software based aids used for troubleshooting but only enhances their capabilities.

The Analytical and Strategic Troubleshooting System and information obtained from it are used in conjunction with manufacturers manuals, company procedures, and computer/software based troubleshooting tools to return aircraft to service with minimized impact, both operational and financially. Introducing a thorough troubleshooting process reinforces the value of existing tools, increasing the operator’s return on investment (ROI) for these tools.

The system also prompts post-fault actions or preventative maintenance, which may translate to procedural changes, manual revisions, reliability data,
Operator or Maintenance Organization

DECREASING

- INVENTORY
- COMPONENT NO FAULT FOUND
- INVENTORY MANAGEMENT
- COMPONENT LOAN COST
- SHIPPING & CUSTOMS
- TOOLING & EQUIPMENT COST
- RECURRING DEFECTS
- MAINTENANCE MAN-HOURS
- NO. OF OPERATIONAL DELAYS
- LENGTH OF DELAYS
- INDIRECT DELAY COST
- OPERATIONAL RISK
- ADMINISTRATIVE COST
- EFFECTS OF HUMAN FACTORS

CURRRENT OPERATING LINE

INCREASING

- IMPLEMENTATION COST
- TRAINING
- SAFETY MARGIN
- UTILIZATION
- RELIABILITY
- CUSTOMER CONFIDENCE
- R.O.I. OF SUPPORTING SYSTEMS
- MAINTENANCE CAPABILITIES
- WORKFORCE SKILL
- WORKFORCE KNOWLEDGE

= Positive Impact (financial or operational)

= Negative Financial Impact

Technician

WORK PLACE STRESS

SKILL LEVEL

SENSE OF ACCOMPLISHMENT

CAREER ADVANCEMENT

Figure 1-1
Aircraft type-specific training does not always cover troubleshooting. If troubleshooting is covered in the type course it is aircraft system specific, which too has benefits.

**Elevating our profession**

The Analytical and Strategic Troubleshooting System is a process which can be utilized on almost any aircraft or system it contains. This transferable knowledge becomes invaluable in the troubleshooting of aircraft defects.

Critical thinking exercises in the form of real world examples are used to enable the technician to develop these sound skills. The Analytical and Strategic Troubleshooting System introduces a set process that is not product-specific but can be utilized in every system, and all fleet types. This makes the Analytical and Strategic Troubleshooting System a very unique technical training and a valuable asset to individual technicians and the maintenance organization alike.

The knowledge and use of the Analytical and Strategic Troubleshooting System plants the seed for a competitive more proactive workforce with the ability to foresee the cost and performance benefits. As the individuals work through their daily tasks with this proactive mindset and “on the scene” approach to cost savings and improved performance, the rewards will begin to mount. As this proactive approach establishes itself, it will avoid situations of “why was that part changed and look what it cost” by dealing with them correctly from the outset.

For years many have tried to raise the status of the maintenance technician, mechanic, the “wrench” or “grease monkey,” and they should be commended.

**The changing workforce**

Maintenance organizations have been and will continue to struggle obtaining and maintaining a skilled workforce, partly due to the changing demographic of the world workforce.

Another factor affecting the skilled workforce is prior training, as most aviation maintenance training institutions (as well as manufacturers) often do not provide adequate training in sound troubleshooting procedures.

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—ANONYMOUS
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Often other professions in the industry overshadow their work. After all, technicians are typically in a behind-the-scenes role. Technicians are professionals and need to maintain that status by continuously providing safe, reliable and cost effective delivery of aircraft for service.

This high standard can be maintained and built upon with many of the given procedures, be they manuals, checklists or regulatory requirements. This then prompts the question “Could troubleshooting be a set procedure?”

The answer, in short, is yes. The remainder of this text details the troubleshooting procedure, the methods and the means of implementing it.