

Safety Management Systems: A Maintainer's Perspective

by Roger Beebe



Summer 2005 in northern Saskatchewan with a Transport Canada King Air. From left: TC pilot Bill Hanson; Marty Fowler, General Manager and PRM of Courtesy Air; and author Roger Beebe, then Transport Canada's Director of Civil Aviation, Prairie and Northern Region

"Just what is this SMS thing and where did it come from?" The more sceptical of maintainers might believe it's some sort of plot by regulators led by Transport Canada. Others may trust that SMS was developed by the people who study human behaviour and safety. I originally thought it would be easy to write about SMS but I was wrong. The reams of material are available on-line (just try a Google search!) as well as a mountain of books, guides, pamphlets, etc. written by safety experts make it hard to be original. My purpose in this article is, therefore, simply

to explain the origins and purpose of SMS from my own experience and perspective: I believe SMS is a logical and practical step in the quest for aviation safety and not a bureaucratic system dreamed up simply to make maintainers' lives more difficult.

I must admit that in my early training in the Royal Canadian Air Force I never gave much thought to safety as a "system" — not because I didn't care about people, equipment and resources but because I was busy learning a trade and working in a very structured environment. Although "Airmanship" was a term more associated with flight (pilot) operations, there was certainly a standard of workmanship, care and pride associated with the

maintenance work. It was not codified but was set by the work place norms of the senior Non-Commissioned Officers. When I left the Air Force and joined the civilian aviation industry, I found myself in a less structured workplace but one that also had its norms and was led by experienced senior Aircraft Maintenance Engineers and technicians who set the example. I soon found out that this system functioned reasonably well, delivering a good level of safety through the technical excellence and the dedicated work habits of the staff.

Origins

Early aviation's progress was made possible by dedicated and skilful pilots, engineers and technicians who, in many cases, had to learn through experimentation and experience. We cannot underestimate the great work of professional engineers and manufacturers, who began the long road of improving safety through engineering fixes. In the Second World War, a high demand for parts required absolute precision in dimensions. Enter Quality Control Systems with direct inspection of maintenance work some of which remained in place into the 1960s.

At this time, flight safety was still very much considered to be related to pilot capability, depending on a pilot's skill to overcome equipment failures and operational challenges. Accident investigators blamed pilot error when no other cause could be found. But some people began to think in terms of preventing accidents rather than finding a cause and apportioning blame after the fact.

In both military and civilian aviation in the '60s and '70s we had lots of manuals and procedures. I remember taking only one very short course about a maintenance control manual and then it was back to work. We all knew we had to complete logbooks, snag sheets, etc. but our safety-system knowledge was sparse at the working level. Before the days of community college aviation maintenance courses, new AME apprentices were mentored by a core of ex-military maintenance staff, whose experience in the Second World War carried military airmanship norms

into civilian industry. There were a few civilian college courses but not in the numbers we see today. Another factor was the arrival of very complex jet aircraft and avionics, which demanded new thinking and even new trades. This meant that management systems were needed to ensure the new generation of AMEs and technicians understood the entire system. This led to much more regulatory effort on maintenance control systems, inspections and audits by industry and the federal government's regulatory body, now called Transport Canada (TC).

It was obvious by the '80s that a different approach to aviation safety was needed — a more complete systems approach. Some people like to talk of management systems in terms of "Command and Control", or "Participatory Management" or "Consensus Management". I have seen the benefits of all types of management and believe that all have benefits in different situations. All the management problems we see today have been seen before in different cultural or technical environments. However, I have to agree titles do help explain things and are useful from that point. People came to realize that safety could be improved by the understanding of human factors, sharing data and (perhaps most surprising) moving away from a punishment attitude toward mistakes to one of learning from the mistake.

With the advent of almost instant global news reporting, aviation accidents around the world added to the safety worries of the public. In Canada, two landmark inquiries, The Dubin Inquiry into Aviation Safety and the four volumes of the Moshansky Commission into the 1989 Dryden crash, gave impetus to Transport Canada to modernize regulations and policies.

By the 1990s, Quality Assurance became firmly established as the model used by aviation engineering, manufacturing and maintenance to assure safety. Still accidents continued to happen and with increasing global aviation traffic, another move was needed.

Enter SMS. Early work began in the United Kingdom but soon spread internationally and came to be applied in many industries. I believe Canada was the first to take SMS theory and put it into widespread practice. This would not have been possible without strong leadership from industry, Transport Canada and some brave politicians.

Why SMS?

Once you track the history of aviation safety, it becomes apparent that a total systems approach was needed. Transport Canada used to chase after AMEs or pilots but soon found that an AME or pilot cannot have much influence on long term safety unless the owner/CEO supported them. SMS makes everyone accountable, not just a safety officer, AME or pilot — and “everyone” includes the CEO. SMS definitely brings the entire organization into safety accountability and that is its strength.

There will of course be initial costs to companies for the preparation of manuals and procedures and in preparing for assessments. There will be a learning curve for both the maintenance industry and Transport Canada officials as they perform the first assessments. Maintenance personnel should take some comfort in that the more rigorous reporting systems will get their issues addressed. Not to be underestimated as a tool is the Transport Canada Civil Aviation Incident Reporting System, which can be used by everyone.

Transport Canada Civil Aviation Safety Inspectors will be working under TC’s own SMS System in the Civil Aviation Directorate. Even more than before, SMS will deliver to Canada’s maintainers the tools, policies and practices and training they need to work safely. I can personally tell you that SMS and the Occupational Safety and Health regulations make the workplace a much safer place than it was in my early years. Then, we all worked hard to pass TC audits and inspections, and now will do the same with the SMS assessment. I think it will be worth the effort.

The Goal: Accident Rate of Zero

SMS builds on the collective wisdom of some 100 years of aviation safety work by many bright and dedicated people. It has been possible to embark on such a forward thinking program because our predecessors built a safe system. The goal of zero accidents may seem to be an impossible dream but I believe that SMS will help achieve it.

I have seen both military and civil aviation go from accepting accidents as a necessary cost of doing business to today’s risk management and systems approach. In both military and civil aviation posts, I found communication to be the key, whether it be through shift change-over meetings, pilots debriefing maintainers, briefing management on technical issues, or explaining to customers why the departure is delayed. SMS should enshrine communications as a major factor in avoiding accidents. More incident reporting and safety issue reporting — both within organizations, and between Transport Canada and industry — will be another key benefit in the quest for safe skies.

I cannot predict what may follow SMS but I can reasonably suggest that, if SMS is not a success and accidents increase, the hard hand of the law will come into play because Canadians will not accept an unsafe system regardless of our hard work. So let’s all make it work. ■

*Now retired as Regional Director, Prairie and Northern Region, Transport Canada after 10 years in the position, Roger Beebe also held other positions in his Transport Canada career, including Director, Airworthiness Western region, and positions at Ottawa HQ and in Ontario Region. His civil aviation experience includes Air Canada and Wardair. He also served six years in the Royal Canadian Air Force, mostly in Europe at 1 Wing Marvell, France, and Lahr, Germany. His aircraft experience includes B747, L1011, DC-8 series, DC-9 series, B707, B727, Twin Otter, Single Otter, Bristol 170, Viscount, and many 1960s military Fighter Aircraft, especially the CF-104. He holds an AME licence in the categories M1 and E, and CAMC certification as both an Avionics Maintenance Technician and an Aircraft Maintenance Technician. Roger now lives in Manitoba where he is President of **Plane Talk Consulting**: 204-232-8819.*