

Maintenance Resource Management Update at Continental

John Stelly

*Director, Systems and Training
Continental Airlines*

INTRODUCTION

One of the things that is apparent to me is that as you start to implement maintenance resource management within the organization, you've got to be very perceptive about where you look for the benefits of the program. Sometimes, the benefits don't always show up in operational measures and other statistics on which we all like to focus. A good example of this is that for years I am sure most major carriers have had what we commonly refer to as "our morning delay meeting," where everybody in maintenance gets together, hashes through the yesterday's operation and begins to focus on what we are going to do today to fix what happened yesterday.

I've sat through our delay meetings for years and, as is probably the case in many carriers, if you really sat through and looked at the delay meetings, they are not really conducted the way a meeting should be to get things fixed. They are usually pretty negative, focusing in on what happened yesterday, who was to blame, who was at fault, why do we have this delay, these delays weren't our's they were somebody else's. It's really a lot of haggling back and forth and usually not very positive. But look at the meetings from another perspective; go back and really focus on delay meetings held about a year ago. You'll see that it's kind of like watching a clock. If you sit there and watch it for long enough you really can't tell that it is changing, but if you step away for a while and then you come back you realize the amazing amount of difference. The delay meetings that we have today are radically different from the past from the standpoint of the change in focus. Although we still talk about what happened yesterday, the primary focus is corrective action for today and tomorrow.

A good case in point happened just last week to George Mason, our VP in maintenance. We had a really bad delay out of LA, an international flight, which required an engine change. This was a six-hour delay, and we all know the importance of international flights. George asked a very simple question: "What happened?" In the past that type of question from the VP of maintenance would have caused all kinds of wailing and gnashing of teeth, cover up and excuses, but in this instance that didn't happen. The supervisor happened to be on the call; he specifically said what had happened. The inspection revealed that an engine change needed to happen and the supervisor admitted on the call in front of tons of people that they just screwed up; they didn't have an engine ready. Rather than castigating the supervisor publicly, the general response was: "O.K. what do we need to do to fix it, so that it doesn't happen again? What do we need to do in terms of focusing our operation to make sure that we have got an engine prepared, standing by ready, or whatever we need to do in terms of contingency plans to make sure that it won't happen again."

George Mason didn't shy away from the fact that he really needed to know what happened, because someone above him was going to be calling about the delay on an international flight, but it was a completely different tone, a completely different way of focusing on exactly the same problems in terms of being more proactive. Everyone who was involved in that delay really felt much more comfortable. The consensus of opinion was that here is an organization that supports me and we are really focusing on what we can do to fix it so that it doesn't happen again, as opposed to focusing on the negative side of the situation. This was a totally different tone, different way of problem-solving.

I really want to focus on three things today. I want to give all of you a program update on what's happened from 1991 through 1996 to maintenance resource management at Continental Airlines. I am going to speak briefly on some operational performance indicators -- what we have done and how we have seen our operational performance have been impacted by this program. Then I want to spend a couple of minutes on lessons we learned. I am a firm believer in being able to share with you information we have learned from our program. There are some things that I have learned over the years, instances where we could have done a little bit better, and if we could have done a little bit better, I want to be able to share that with you. I heard yesterday that many of you are beginning to embark upon similar programs. Frankly, if there are some things that you can take out of this that will help you avoid the mistakes we made earlier in our program, I want to share those with you. These are the topics we are going to go over -- Program Updates, Operational Performance and Lessons Learned.

PROGRAM UPDATES

First -- Program updates. We changed the name of our program from CCC to MRM -- Maintenance Resource Management -- kind of an update to freshen it a little bit. It's from past proceedings. It's a two-day program focused primarily on awareness and built around case studies. We use, for example, as our intro the famous incident in Portland. We study as examples of maintenance mishaps the Eastern Airlines 855 and a couple of rather significant ground mishaps that happened within Continental Airlines. Both of them happened in Guam. One was two DC 10s that decided to try to get too close to one another. The wing tip of one sheared off literally everything from the nose up to the forward pressure bulk head of the other DC 10. Another incident was a towing mishap we had where we put a DC 10 on top of a house, in navy housing, which was a rather significant event to say the least. Phase 2 of MRM is a one-day program. We focus on conflict resolutions and the case study we use is the Continental Express Eagle Lake accident which, if any of you have read the NTSB report, is chock full of good information on how maintenance operates within the environment

Some background on the program. In June 1991 we implemented the program. We focused primarily on management supervisors within the line operation. You will hear me speak more about that in terms of our lessons learned. We started some operational attitude performance measurement. That really started in May 1991; just prior to that was a base line survey that Bill alluded to earlier. Actually Jim Taylor and Michelle Robertson assisted with that -- doing a base line survey, and actually tracking operational performance measures. We looked at 14 to 15 different operational performance measures on a monthly basis at the station or departmental level. Now we have five to six years worth of data for all those and correlated back to attitudes.

Back to the point I made about management; in 1991 when we started, the sponsor of the program said we had to include everybody. That meant VPs on down; no one was excluded. It's 100% participation -- everyone's got to go. In those programs we had everyone from the Vice President Maintenance through the VP engineering, all actually sitting through the program. This was a tremendous benefit and really sent a strong managed message to the other members of the work force that management was committed to this program. If management can take two days out of their busy schedules to attend, it sends a very strong message. I would highly encourage this kind of participation if you plan to implement a similar program.

In 1992 and in 1993 we expanded the population to include lead technicians and inspectors. It was our intent from the inception of the program to ultimately include everyone within the maintenance workforce and any one who was peripheral to that work force as well -- people in materials and purchasing, financial people. Basically, anyone who had a connection to the maintenance operation should participate in this training. However, we kind of triaged it and moved downward from management to leads and supervisors, and later on we got to the technicians.

One of the things we found when we got to this is that you get some very interesting case studies that come right out of the workshop. These become excellent food for thought in terms of providing additional information. For example, I was facilitating one workshop and a lead says that his work group got into the discussion of norms. In these discussions you always ask "Has anything ever happened; have you been subjected to this and had something bad happened?" We finally had one lead raise his hand. This is the power of this type of training -- when people within the group volunteer information and relate their own war stories, it has a tremendous impact on the entire group. As I said, one lead technician raised his hand and said that several years ago it was a norm within their operation on DC 10s rather than changing a slide to just change the bottle on the slide while it was aboard the aircraft. He says there were three of them on a DC 10 about to leave on an international flight and they were supposed to change the slide. They didn't have to change the slide so they figured how to get the case open and just change the bottle. They got the old bottle off; they got the new bottle on. They did something wrong. They still don't know what they did wrong, but guess what happened -- pop the slide, slide began to inflate in the cabin of the forward galley of the DC 10 15 minutes prior to departure. So there are three technicians pulling out their pocket knives trying to stab at the slide while first class passengers are boarding the aircraft. One of them is pinned up against the other bulk head saying: "Get me out of here." These type of stories are tremendous in terms of the effect that they can have on a class and then are shared elsewhere within the organization. You will hear some really humorous things as you move along this path.

In 1994, we opened the course up and included all of our technicians. We also made the course available to our compatriots at Continental Express. We began an MRM for management, the one-day course I spoke of earlier. Prior to July of 1994 here at Continental Airlines we were really focusing on re-engineering -- what we can do to improve the operation, improve our cost structure. Actually in July 1994 we began to implement many of the decisions that we had been researching for the six to eight months prior to that. Let me touch on that briefly in a moment because I think it has a significant impact on how we proceeded.

OPERATIONAL PERFORMANCE

In 1995 many of the major things we did in re-engineering were completed. We implemented the MEDA process that you heard about yesterday from Jerry Allen. In fact, all ground mishaps attributed to maintenance were investigated during 1995 using the MEDA process. In July of 1995, we suspended our workshops on MRM 1 & 2 primarily because of the turmoil resulting from the re-engineering effort. I'll also touch on that in a moment. We also began a research project with Drs. Endsley and Robertson, who you will hear from shortly, on researching team situation awareness and how that's going to merge with our existing awareness programs. Let me talk about the impact on operational performance for a moment. I am actually going to cover these in reverse order. I am going to cover re-engineering first, and then maintenance mishaps.

If you can imagine for a moment, think of your own operation, think of how you do business today, and focus on your operation. Try to put yourself in this frame of mind. Imagine within your own airline today, or within your own operation, that within a span of a year, while operating under bankruptcy, you are going to cut your hourly work force by 50%. You are going to cut your management work force by 50%. You are going to rewrite your entire maintenance program on all your fleets. You are going to outsource 90% of all your heavy maintenance. You are going to outsource some of your line maintenance, but not too much, about 10%. You are going to outsource your component maintenance. You are going to shut down obviously two or your three major maintenance bases. You are going to move all those people and centralize them in one spot. That, by the way, will cut off 50% all at the same time and do that within a six-month window.

What do you think is going to happen to the operational performance of your airline? To dispatch reliability? To on-time performance? In reality that didn't happen. I personally think that one of the reasons that didn't happen was because of the maintenance resource management program that we had implemented early in 1991. We prepared the workforce and had created a sense of awareness within the workforce regarding communication, decision making, assertiveness. When these rather dramatic changes occurred within the workforce, we had people within the workforce who said, at the appropriate time wait, stop, this is unsafe we need to do this, or we need to do this differently. It really created an environment that, I think, allowed us to get through the rather radical changes that we went through in 1994 and 1995.

This is what we did. We outsourced practically everything. In June/July 1994, we shut down our Denver maintenance space -- seven heavy check lines. We didn't take a long time to do it. It happened in 30 days -- here today, gone tomorrow. On November 6, 1994 we did the same thing in LA, and then had to try to regroup and get everything taken care of. We consolidated all of our support departments out of LA and Denver into Houston. We rewrote our entire maintenance program just prior the consolidation. ([Figure 10-1, appendix](#)) shows what happened on maintenance mishaps during that same period. The blue represent the number of mishaps that we had. These are ground mishaps related directly to maintenance by year. The yellow line is the trend. For example, in 1995 we had 27 ground mishaps. We keep track of everything. A ground mishap is anything from a technician running a ladder into an airplane to anything else that may happen. Obviously we had a spike in 1994. For 1991, 1992, 1993, we were on a good downward trend. We had a spike in 1994 primarily attributed to a lot of internal turmoil. But in 1995 we recovered and we were right back where we were supposed to be.

Dollar figure wise, if you take out the Guam incidents, which were rather spectacular, and throw out the high ones, we were averaging over this five-year period about a million dollars in damage to our aircraft from ground mishaps, damage attributed directly to maintenance. The 1995 number is actually four hundred and sixteen thousand dollars; we are about a half a million dollars below our five-year average, a rather significant improvement. To date in the last two months of 1995, we have had only two mishaps. We had one on November 1st; we didn't have another one until December 8th. Of course, I have been here for the last 24 hours, but as of now we haven't had one since December 8th. We are rapidly approaching the point where we are going to be able to say that we can go a month or two without having a mishap. This is really significant because, as many of you know, the two most expensive ways to have a mishap are to have a pilot in the cockpit or a mechanic in the cockpit. Usually they are involved in moving an aircraft and when they are involved in moving an aircraft you can do some rather dramatic things to all that metal out there -- these are the two guys who can damage an aircraft rather tremendously.

[Figure 2](#) shows our MELs from 1992 through very recently and into 1996. I would like to point out that, although it tracks fairly well, this peak in 1995 was the result of the LA base shut down, the Denver base shut down a few months prior to that. Obviously, when you shut down a major facility in the middle of a holiday period and try to outsource all these components and the work, you are going to have a spike. But as you can see, we dramatically recovered in February/March and April. We had another spike in the June/July time frame primarily due to some discussions management was having with the pilots relating to their contract. Those discussions were resolved. And, as you can see, now we are down consistently below a 100 on a fleet of 320 airplanes. Our goal in 1996 is to maintain that at 90 or below on a consistent basis.

Given all the dramatic changes that we have had within the organization, it's amazing to me that our MEL count had as much stability as it did. We did not see it spike up to 200 to 300 to 400 and then take a number of months or a year to come back down.

LESSONS LEARNED

If you implement an MRM program, you are going to have some effects on your culture. It's really going to change the climate within your organization. You are going to have some cases, such as those Comdr. Smith talked about yesterday, where there's even a greater effect on a military environment. We need to remember that a lot of our technicians came out of the military environment or come out of the "Old School". In that regard, when you start talking about giving the technicians the right to speak up and become assertive there are going to be some leads and some supervisors who are going to resist. It's going to really take a strong emphasis by your management team to reinforce what you need to have in place in order for assertive communication to happen. But you really can affect climate; you really can affect culture. It takes a long time to do, but it can have a dramatic effect. You can have an impact on both safety and efficiency.

Most importantly -- Don't underestimate the power of awareness. Most programs are going to start off with an awareness building workshop similar to what we did in some respects. We underestimated the power of simply providing information to employees and then letting them do with it what they saw best in the workplace. However, we saw from a lot of our studies that this trickle down created a sense of awareness. It had a delayed effect according to the surveys we got back. After three to six months, that information kind of percolated through them and through their organization. Employees became much more pro-active and we started to see the emergence of a new attitude -- "Not only do I focus on what and what's happening, on how we do shift briefings, but I am taking a more active role. I am speaking up when there is something wrong." Employees begin to take a more active role after a certain period of time. Allow that to happen and don't underestimate the power of awareness.

Let me go back to something I touched on earlier. I would strongly recommend that as you embark upon a program you integrate your work groups. By that I mean from the top of the organization down -- from Vice Presidents all the way to technicians. Don't stratify the program. Attempt to construct a class or a workshop where ideally you have someone from every level from within the organization right there in the work shop. The other thing that I would recommend -- don't break the program up by departments. Don't do it just for line maintenance, then just for heavy maintenance, then just for support organizations. Mix them all up together -- have a homogeneous group that has Vice Presidents, directors, technicians, supervisors, maintenance controller, engineers, planners, throw in a couple of clerks as well. It's amazing the amount of synergy that you will get out of that group. You'll hear things like "I didn't know you were the SOB I talked to all the time in maintenance control." You will find that after two days they are best friends and, in addition, they now have a contact down in maintenance control, or maintenance control now understands more of what is happening out on the line and vice versa. This homogeneity has a tremendous effect; don't underestimate that. I would encourage even those of you who have some constraints relating to unionized environments. If these constraints cause you any restrictions, I would encourage you to do whatever you can to break down those barriers and mix those groups together. It will have a tremendous effect and you will be extremely pleased.

My third point is -- measure what you do, even if it is nothing more than keeping track of who went through the program. Then, when you look at operational performance measures at that station or whatever you normally track today, watch as people go through the program. If operational performance improves, or as in the case of Northwest talking about their 747 lines, if you get a benchmark prior to starting the training and you put everybody through the training, watch what happens afterwards. This tracking is going to be extremely valuable to you in being able to keep the program going, to sell it to upper management. As we all know, there is always change in upper management and they are always looking for the value of programs. Additionally, tracking gives you an opportunity to tweak the program as well as to tailor it more specifically to your needs. It always feels good to be able to look back on a program and say we implemented this. This entire work group went through it. We can discount all the other factors; we can attribute increased performance to a number of things from structural changes within the organization to improve automation. But there is always going to be that piece of increased performance directly tied to maintenance resource management. Justify that piece and you keep the program going.

APPENDIX



Figure 10-1: Maintenance Mishaps



Figure 10-2: Maintenance Mishaps