MEETING WELCOME

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There is considerable interest today at the FAA in the subject of aircraft maintenance and inspection. I personally am very excited about the fact that people are willing to spend their valuable time to get together and talk about something which, it is fair to say, we know little about. We in the FAA are not sure where this interest and this take us somewhere that we would rather be compared to where we are today. Because of the lack of maturity of the subject matter, as some might say, we are in a position where we might be able to make significant contributions to aircraft maintenance and aviation safety with a fairly modest investment of time and resources. It will be exciting to be a part of this activity.

I am impressed with the cross section of professional brought together to address today's topic - people from academia, the airlines, the manufacturers, the FAA, and a number of other fields with activities relating to aircraft maintenance. Only a collective effort and cooperation of this type, in a nice quiet room, will result in the progress we need.

What we are really talking bout today is human performance in aircraft maintenance, including everything from training of maintenance personnel to development of procedures for maintenance of complex digital flight equipment. We are particularly concerned with the human's role in the inspection of older aircraft which have been in the fleet for twenty or more years. We begin, of course, with the full realization that a large measure of professionalism exists in the maintenance business today. The problem is complex and will not be solved simply by urging the industry to bring more professional aboard or recommending a nice warm room in which to perform maintenance.

The problem, as I see it, is that we do not have an organized body of information that we can apply when an engineer determines the an inspection is needed for cracks in a particular section of an airplane. How do you do that inspection? What should the engineer know about principles of human performance that will ensure that the inspection is performed with best accuracy?

The FAA at this time is preparing an Airworthiness Directive for release which will require additional inspections for certain older aircraft. For illustrative purposes, and these may not be quite the correct numbers, these inspections use a 40,000 landing cycle threshold to begin inspections, followed by a 4,000 landing cycle for repeat inspections. In this case, we are applying the same inspection criteria to an aircraft with 70,000 cycles as we are to one with 30,000 cycle. This bothers me because the process for deriving the threshold to inspection and repetition assumes that the development of cracks may be detectable at 40,000 cycles and that, if cracks are not found, the aircraft may be flown safely for another 4,000 cycles before new cracks can develop to a hazardous extent. When this process is applied to an aircraft with 60,000 or 70,000 cycles, we are saying that if the aircraft is inspected in the next 500 cycles and then 4,000 cycles later, it will be safe. We now have evidence from two recent instances, well known to most of you, in which we found that this may not be true.

In the well-publicized Aloha Airlines incident, the airplane was inspected and an airworthiness action performed just a few months before it had the tragic inflight episode. Then, just recently we found another airplane, with another airline, which had about 50,000 to 55,000 cycles and had developed a major crack and a number of smaller ones. This airplane also had been inspected earlier, with its cracks discovered only as it was going in for repainting. So here we have two airplanes, with all the attention focused recently on 737's, for which somehow the system did not work. We have professional involved in engineering and professionals involved in maintenance and yet cracks developed undetected.

We must develop an improved approach to the inspection process and, more important, it must be an organized approach. We need to take a technological approach, break the process into its components, and then examine each component to see if we can build a body of knowledge that will apply.

Is vigilance the issue? The job of performing these inspections can be terribly boring and the job frequently must be performed under adverse conditions. Is vigilance simply the answer? Or are we expecting too much of people at any level of vigilance?

What about training? Aircraft of today are more complex and employ a variety of material and construction techniques. New systems are available for the inspector. Has our training establishment kept pace with these changing technologies. While I suspect that it has at least to certain extent, I do not know whether additional attention is required on training.

Another issue is communications. How do engineers at a manufacturing facility, where a Service Bulletin is written, and FAA engineers, who approve that Bulletin, communicate with engineers at an airline and with airline maintenance personnel? How do we communicate what we expect and suspect we do a heart-felt job but I do not believe we have good guidelines to follow. This is a part of the system that has never been critically analyzed.

Then there is the work environment. Chicago in the winter can be a cold place to be. Tasks that normally are routine and that must be performed hundreds of times can be quite difficult under these conditions. When you look toward some of the more subtle inspections we are talking about, there is a question as to whether we are realistic in expecting quality performance under adverse working conditions.

So, how have we gotten away with it? Well, I am not sure we have gotten away with it. We have seen some significant maintenance-related accidents in the last decade. Also, the average age of the fleet is increasing. As a result, greater demands and greater reliance are going to be placed on the maintenance and inspection functions. We must know the good and bad points of these functions and how to deal with them.

One avenue for consideration, and a favorite topic of mine, is the use of robots. When I visit Boeing, I see huge wings being automatically drilled and riveted. Excellent use is being made of robotics technology. But when I go to an airplane on the line or in a maintenance operation for heavy checks, I do not see a lot of automation being applied. Why not? Possibly because it is expensive and not readily available. But shouldn't this be something we look to as a basis for improvement? Shouldn't we encourage industry to develop effective ways to use robotics? While this might not provide an ultimate answer, it could contribute significantly.

In the future, we will be relying not so much on the genius of the designer and the production staff but, with the aging fleets, on the genius and the dependability of the maintenance staff. In other FAA programs related to the aging aircraft fleet, we are looking at the structural aspects of aircraft design, our database requirements, and actions to be taken. But no matter what we do with regard to design improvements or production improvements, we must recognize that we will rely more and more heavily on maintenance in the coming years.

Let me close by again thanking you for coming. We are here to exchange information and listen to ideas. Even if, as a result of all the thinking and talking we do here, not a single FAA Directive is written, I am confident that the exchange of information among leaders in this part of the aviation industry will be worthwhile and, in itself, will result in safety improvements. Thank you.