

or twenty-sixth one-thousandths of an inch. And we have had some problem getting these welds within that spec. What happens if it's too far out is you have to cut it out and reweld it, so there goes at least a week. We have lost quite a bit of time in our schedule fighting the welding problem.

Then we have the general statement here called "engineering changes." These are all the things that occur in an R. & D. program, where, as you progress downstream and you put the hardware together, you learn new things. You now have to go back and change the hardware you have already built. This is a process that goes on continuously throughout the life of almost any program, particularly R. & D. programs, such as this. But even the airplanes you gentlemen are flying in today are still getting minor changes on them. So it's a process that goes on continuously. We expect it; nevertheless, depending on how severe some of these changes are, they do impact the schedule.

Now, these changes (I'll just say one other word to clarify them) come about in part due to our own design not being just exactly right the first time. They also come about in part from changes that result from interfaces with the stage below us and the stage above us. So these changes come from all directions, both from the customer to North American and internally.

I have listed a thing here, which is probably not too familiar to most of you, called "Material review actions." This is the cycle, part technical and part administrative, that we get into any time we have a problem such as having made a weld which is not up to specification. We have to X-ray the weld; we have to read the X-ray; we have to discuss it with our quality control people and discuss it with our engineering people and our manufacturing people; we have to decide whether it's acceptable as is or whether we have to fix it; and we have to discuss it with the customer. Every time we have an insulation problem, or a weld problem, we get into one of these material review cycles. And if we get a number of these actions, quite a bit of time goes by. Every time you don't do something exactly right, you have to go back and do it over, and this is one of the major things that makes the schedule slip. If we could do every job right the first time, we'd save a lot of time. We wouldn't have to go through this cycle.

This is the 1.6 insulation. These are the hex cells I was talking about. It's filled with a foam material. This glues on the side of the stage, all the way around the hydrogen tank. This is the nylon-Tedlar cover. This piece was made by North American, and, while it looks pretty husky, we actually had trouble with that facing sheet ripping off under pressure. Now, we have had so much trouble with this insulation that we developed a simple foam insulation. We are proposing now, at about stage 7, to use this simple foam. We just spray this foam on the side like you would paint a garage. It foams up, then we go over it with the cutters and smooth it off and we wind up with about an inch thick of the foam which has similar thermal characteristics to current 1.6-inch insulation.

Mr. WINN. Doesn't Tedlar have a similar type of cover there? That's more like an onionskin paper, and that's more like cardboard.