Super Lightweight Tank

Case Study Transcript

Bryan O'Connor, Mike Pessin & Parker Counts **Space Shuttle Overview**

Bryan O'Connor:
The approach of dropping what we thought was a stretch of about 8,000 pounds, hopefully 7,000 to 8,000 pounds off the external tank was going to be a pretty gutsy call actually because we were going to have to change the material of basically the entire structure of the tank. We had what we called and had called for some time, the light weight tank. To do more than that, we decided we would call that super light weight tank. The emphasis was on new material, which wasn't really new, and industry, I think the Brits had come up with this back in the 50's. But it was aluminum-lithium and aluminum-lithium was known as having very good material properties and a lot lighter weight than the aluminum we were using on the lightweight tank. But there were also some known problems with it that we were going to have to deal with. One of which was how you weld it. Welding aluminum lithium had been a concern to people who had tried to use it in applications like ours before and we knew we were going to have to address that big time.

Mike Pessin:
The external tank had been looking at a weight reduction program, which was later called the super light tank. We had gone through a lightweight tank, which had taken 10,000 pounds out of the tank; the tank had gone from 78,000 pounds to 68,000. We had taken another 2,000 pounds out over the years – so we're down to 66,000; and this was going to get it down to about 58,000 pounds. So when we got into the super lightweight tank – the easy options had all been done!

Well, in this case, we were really in a circumstance where the agency desperately had to have the performance – without it we weren't going to have station! To go back for another redesign of station to get it down to the shuttle payload capacity would have meant having to go back to Congress; and as I mentioned, the station barely survived its last cycle in Congress. So the agency and NASA – and maybe I'm egotistical but I feel the whole country – had to have this performance, had to have the station; because if the station went down the tube as a major international program, the dignity of the U.S. would have suffered badly. So, we felt that it was absolutely necessary to have it!

Parker Counts:

Kind of scary when you think about it in terms of, you know – the whole shuttle program and the space station program are kind of riding on your shoulders – if you don't do your work and get the tank weight out, it's a no-go!