WHITHAM D REEVE • REEVE ENGINEERS

A wrench in the works

In the summer of 1965, I went to work in the family airline business as a radio technician. As a new hire, I got the jobs that were in line with my experience and that nobody else liked to do, such as sweeping the floors and cleaning the shop. One interesting assignment was to repair and overhaul the large backlog of MG-149G and H-model rotary inverters. Our DC-3 and C-46 airplanes used the inverters, dc motors with ac generators that ran off the airplanes' main 28V-dc bus and supplied 115V ac and 400 Hz for certain radio-navigation equipment and instruments.

Overhaul involved completely disassembling and cleaning the unit. Once I cleaned up the components, I thoroughly examined them to check for anything out of the ordinary. The inverter rotor had a bearing in each of the end bells. The rotor had some sealed bearings and some open bearings. I had to thoroughly clean and regrease the open bearings. All bearings required hand operation to make sure they were smooth. Upon reassembly, the inverter end bells, bearings, and rotor had to be in perfect alignment, which I accomplished by starting up the inverter on the bench, listening, and then lightly tapping the end bells with a nonmetallic hammer to align the bearings.

It took me a week or two to work through the stack of inverters, but I finished them. Our spares rack was now full of shiny, clean MG-149 inverters. By now, though, everyone considered me the inverter expert. I received instructions to remove the No. 2 inverter from the DC-6 over in the hangar and take it to a local shop for overhaul.

The DC-6 used a much larger inverter than the MG-149 due to the larger ac load. Our test bench was not set up for the larger inverters. Off I went, but not before asking where the inverters in the DC-6 resided. It turns out that they were directly behind the radio rack in a closed compartment, with No. 1 at the top and No. 2 at the bottom.

When I climbed into the DC-6, I popped the fasteners that held the compartment covers and exposed the two inverters. I scoped out their mountings and electrical connections. There were two large, approximately #4/0 AWG wires for the 28V-dc input and several smaller ones for the three-phase ac output and on/off control. The ac system in the DC-6 used a delta configuration with one corner grounded.

I decided to disconnect the large dc wires first and grabbed an open-ended wrench from my toolbox; the company forbade the use of adjustable wrenches. I started to unscrew the nut on the positive dc input stud. When my wrench hit the enclosure structure, all hell broke loose.

There was a big flash, and the wrench instantly turned red. I had shorted the live dc bus to ground. Nobody told me to have one of the air-frame mechanics disconnect the batteries in the airplane before working on the inverters because the dc bus was hot all the time. The DC-6 had big batteries with lots of short-circuit current capability because they had to start four huge Pratt & Whitney R2800 engines.

I flinched but quickly again grabbed the wrench. It had welded itself to the aluminum structure. Worse, red-hot, molten aluminum and steel had splattered onto the carbon dust that coated everything in the inverter compartment and set it on fire. I was somehow able to pull the wrench away without burning myself. Miraculously, the carbon fires fizzled out, and no significant damage occurred to anything except my new wrench.

I climbed out of the airplane and, still shaking, told the mechanic foreman what had happened. He had a good laugh and said he'd have a mechanic disconnect the battery. I then vacuumed the inverter compartment and removed the inverter without further trouble and took it to the overhaul shop. I realized how close I had come to burning up a perfectly good DC-6 and probably the hangar with it. EDN

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