

Tolerance

by

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Neuport 17 Rotary Engine

“When you take the engine apart make sure you lose no parts,” Sergeant Billy told me not unkindly.

When I volunteered to serve, it so happened that my chosen trade of mechanic kept me out of the front lines and placed me within the safety... well... relative safety of the aerodrome. In reality I’d been but an apprentice in a machine shop, but that was enough to ensure being grabbed up by The Royal Flying Corp. Apparently the farmer’s sons who’d also volunteered had little or no knowledge of things as uncomplicated as a bolt. There lot then would be the Lee Enfield and bayonet along with a lot of digging.

“Bolts are not all the same, ya know,” the sergeant told me as we worked. He wore a large canvas apron over a uniform that was far from unstained and his normally white paws were mostly now stained black from the oil and grease they were constantly a part of. “Most have a special tolerance to be made to and are machined to perfection the same as any of the other piece of the engine. They must fit the hole and not be sloppy in the fit.”

“I’d never thought of that,” I admitted.

Ours was the job of recovery and rebuilding. Engines recovered from the field were brought to us and painstakingly rebuilt and reused. It didn’t matter if the pilot had died or was wounded. Nor did it matter if the airplane had burned to the ground; if the engine could be fixed it was needed. I was told that even the Germans coveted our engines and would use them if they could lay paws on any that might be fixed.

“It’s a pity they are not all built identically alike,” Billy told me as we struggled to pull a cylinder off of a rotary brought in the day before. It had been caked in mud and the remnants of the propeller were still attached to the crankshaft. “If they were, then we could simply disassemble all of them and keep the cylinders on a shelf once we confirmed they were good. But they’re all individually made. The pieces look the same but sometimes they don’t fit quite right.”

“We can’t do that?” I asked, feeding into the sergeants need to talk. My grandmother told me once, ‘Never pass up an opportunity to learn something,’ so there you are; I was learning as we went.

Billy was a marvelous mechanic. I dare say that when he’d finished an engine and it was as perfect as it could possibly be. “Eventually they will learn that lesson, I’m sure.” Holding up a bolt, he looked at it and then told me, “Close tolerance, fine thread, and finely tempered, made of high carbon steel. This one is meant to hold a cylinder in place so it needs to be strong.”

Looking in the pan where I was tossing my smaller salvaged pieces, he picked up another bolt of equal size and shape. Holding this one up he told me, “Plain iron with a coarse thread. This one is only good to hold a plate in place or some such other thing that has no pressures involved. These are a dime a dozen while the other is singularly expensive; given the care and time required to make it.” Pointing to the threads he furthered, “These are coarse and cut by a hand tool while the other is finely machined. You’ll get used to identifying them given experience.”

Tossing it back into the pan he kept the other and cleaning it off used it on a cylinder he was installing.

“We might not get all the glory the pilot’s do,” he told me absently, “But we’re more likely to live whereas they’re more likely to die. I think I’ll take that as a good trade.”

“What made you become a mechanic?” I asked him as I went back to work removing things from the scrapper.

“I didn’t really have much of a choice,” the big Dog chuckled. “I was not the eldest, so I was not expected to work the farm which would go to my eldest brother. Second eldest brother was slated to become a priest because that’s what second borns do. It saves a fight over inheritance rights and maybe works to get the family closer to heaven. Third eldest brother was sent off to America to apprentice as a printer. Then came the day I was no longer welcomed in my home. ‘Shovel dirt or move out,’ my Da told me one fine morning and that was the extent of our conversation. That was when the land owner came by driving a nice new automobile which just so happened to stall out right in front of the barn. Mind I had no idea of anything at that point but I did somehow manage to get the bloody thing started again for him... I saw a loose wire hanging down under the bonnet and put it back to where I thought it must go. He in turn offered me a place as apprentice to his mechanic. My Ma met me at the door with a packed bag and a loaf of bread. I ain’t been back since.”

There was a moment’s silence as we worked and then he called me over to show me what he was doing. “Now then, the cylinder is in place with the piston inside and I’ve taken care to use only

the right bolts – but – we have to know that each bolt is exactly the right tightness. It can't be tightened too much because you'll strip the threads out and that leads to bad things. It also can't be tightened too little because the bolt will vibrate out and the cylinder might let go... and you know that leads to even worse bad things."

He stopped right in the middle of my impromptu lesson and his ears twitching here and about listening for something I'd not noticed.

"Twenty Three is coming back and something don't sound right," Billy muttered.

We quickly moved out from the large open sided tent and began scanning the skies. A second later he pointed to a place and I saw a small speck fast approaching and barely stable.

The sergeant cursed and then said, "He's lost his bottom wing; St. Thérèse help him!"

Apparently St. Thérèse was listening because the pilot, though he crashed badly, got out of the cockpit and walked away from the wreck with but a bloody gash to his forehead.

Only a short while after that, the two of us were pulling the engine off and carting it to our tent where its pieces with some care and restructuring, would go to complete the motor we'd been working on.

"It's a pity the aircraft is not built as well as the engine," he told me with a wink, "If they were, just maybe I might then try flying one."