Taking the brakes out of the A/C Compressor

OK so if I've only redesigned the tensioner so that you can repair it in 5 minutes anywhere,
It's an improvement

You wouldn't believe it, an hour prior (around Gimpy) to dropping the Ugly one off at Caboolture for the Perkins perk up we had the second A/C breakdown on our trip south from Weipa. This time it was a broken tensioning bracket. So after dropping old ugly off we all walked into Mackas for a cool down and lunch, yep you guessed it their A/C was also busted. OK so we're from the tropics you say what's 43 degrees. Well I 'l have you know that we are hot all year round without any of this stinking hot over 40 deg stuff, that's for you folk down south with your four season thingy's. Sorry the closest anyone has been to four seasons lately is Vivaldi.

Once we got back home via Qantas fully air cond aircraft and no breakdowns, thank heavens. I had a closer look at the factory-tensioning bracket and spotted a couple of problems.

1. The design requires good alignment.
2. If it breaks a simple road side repair cannot be made.

Problem 1. My OKA has done so many corrugated Ks the speedo rattled apart from abuse years ago. Guess the A/C compressor alignment followed suit (as did the Alternator). Replacing the factory-tensioning bracket was not going to help much.
So how to sort out the alignment problem. Firstly I pulled the main bracket mounting bolts out of the compressor and found a couple of interesting things.
The rear factory bolt has a shoulder so that the bolt cannot be over tighten and break the compressors rear fixed mount. The rear bracket mount has about a 5mm gap between it and the compressor mount. The new bolt that I gave the auto leckies was missing. Low and behold caught up in the cross member was its head sheared off at the shoulder. Wait, there was a second bolt head same as the first. Definitely a redesign is needed.
Taking a close look at both of the main bracket mounting holes found the front hole was very badly elongated and the rear hole had a seriously large burr on the back. The front hole allowed the compressor to skew sideways which put a bending load on the rear shoulder bolt and a twisting misalignment on the tensioners threaded section. To fix this properly I need to remanufacture the mounting bracket so that it is exactly the same distance apart as the mounting flanges of the compressor. Big hassle, so I did something easier. Firstly I removed all the burrs. This alone was a b----r of a job. Finally found that my dodgy countersinking tool fitted on the little battery drill and reached into the back cross member and cut the burr down.
I temporarily refitted and aligned the compressor correctly so that I could accurately measure (got out my real verniers) the gaps between the brackets and the compressor mounting lugs. I needed to machine up two spacers one 65 mm long and the other 4.5mm. Got hold of a nice piece of thick walled Stainless steal pipe with an inside diameter of 10 mm (mounting bolt size). Cut the pipe to length on the lathe and slid the two new spacers into place. This done I slid a 120mm x10mm Allen headed bolt (bolt was cut down from 150mm) in from the back, its head just cleared the engine mount cross member flange with a little persuasion. Tightened up the bolt after ensuring that the compressor was aligned with the crank pulley all nice and square. Normally I would weld the spacer in position thus never needing to check alignment again. At a later stage I intend to fit dual V belts to the A/C compressor and the alternator, I will need to move the A/C compressor forward about 12mm. Then I will weld new brackets and spacers properly into position.
Now the compressor could only move in one plane of rotation. The factory tensioning bracket would probably now suffice.

Problem 2. I needed a quick "Out bush" type repair solution for the tensioning bracket.
I came up with a design that used a short length of high tensile threaded rod for the adjuster. The rod screws into the swivel section of the bracket for easy roadside replacement. If the rod work hardens and breaks I simply grab the vise grips and replace it with another piece of threaded rod, pre cut and stashed in the trucks on board spare parts bin.

Having a closer look at the problem I realized that the threaded section needed to self align both longitudinally and rotationally after its compressor attachment bolt was tightened up. This would completely eliminate the side loads that broke the threaded section of the original bracket. Again I grabbed the verniers and measured the gap between the two Compressor mounting lugs. Have a look at the drawing for details. You should be able to take this drawing to any fabricator and get one made. Just get him to measure up your compressor, as a little wear will change things somewhat.