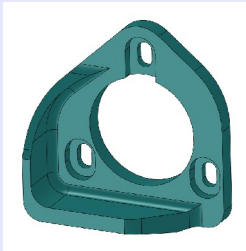


3D GD&T Inspection

Background

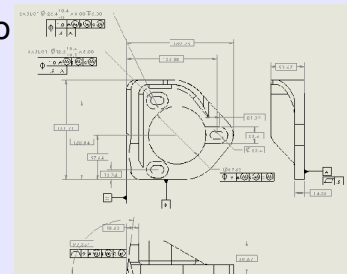
When we wanted to take a look at some machined parts with our 3D scanning process, Andrew Reyes with AMR-Engineering was kind enough to provide us with a sample. The components were part of his new line of high-performance strut brace assemblies designed for rally racing and other high intensity applications.

Our process



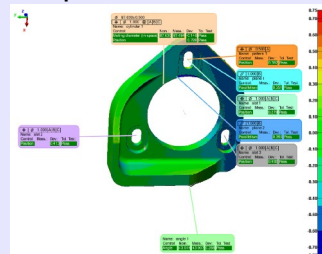
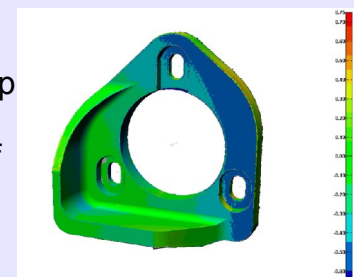
We first brought the machined bracket in to our facility and treated it with a white surfacing agent to reduce the glare of the bright machined aluminum. We then scanned it on our automated scanner, and reassembled the surfaces into a 3D solid.

The original CAD model that Andrew had created to was loaded and used as a reference to measure the deviation of the machined part. We established Geometric Dimensioning and Tolerancing (GD&T) features to define the hole, slot, and surfaces from the design drawing. All of the GD&T features from the design drawing were measured right on the part in 3D.



The results

The color map confirms that the entire profile of the part meets the overall 3D profile tolerance established on the drawing. Our color map showed minor deviations in fillet radii, and machining marks left over from the CNC, but there was nothing would affect the performance of the part.



We then conducted a full GD&T analysis using the 3D scan data as a reference. All of the features were measured automatically in 3D and we generated an inspection report detailing each feature and the deviation from nominal. Features that meet the criteria are highlighted in green. The final report was generated in PDF format and made available to the staff at AMR-Engineering.

cylinder 1	Cylinder			Mating diameter (in-space)	97.907668	97.904456	0.003212
cylinder 1	Cylinder			Position			0.003212
plane 1	Plane			Parallelism			0.003212
plane 2	Plane			Parallelism			0.003212
angle 4	Angle		distan plane C	plane 4	Angle	22.354123	22.427957
angle 5	Angle		distan plane A	distan plane C	Angle	37.354021	37.102294
distance 5	Distance		distan plane B	slot 1	3D distance	94.073019	94.081451
distance 6	Distance		distan plane B	slot 2	3D distance	31.873021	31.366396
distance 7	Distance		distan plane B	slot 3	3D distance	136.473025	136.572981
pattern 1	Slot Pattern			Position	slot 1		0.003212
pattern 1	Slot Pattern			Position	slot 2		0.003212
pattern 1	Slot Pattern			Position	slot 3		0.003212
angle 1	Angle		plane 7	plane 8	Angle	43.618014	43.907938