



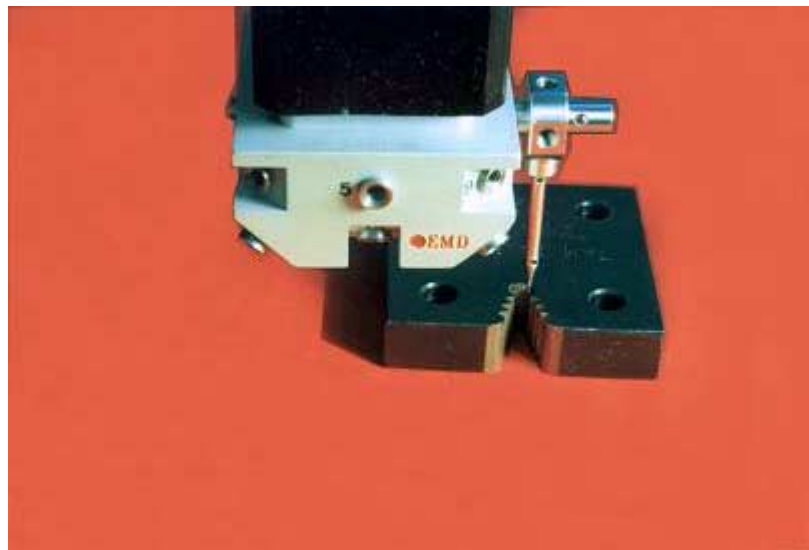
Sceptre Application Notes Aircraft and Power Generation Industry Fir-Tree Analysis – High Definition Scanning

Jet Engines assemblies contain turbine blades that actually pump air through the engine. These blades are held in place to the rotational spin axis on a disc through a set of matched keyways on the disc and the turbine blade often referred to as a fir tree. The blade is usually configured with the male profile and the disc with a female slot.



The slot is usually manufactured by broaching where the machining grain is lengthwise through the slot. High dimensional and profile precision is required on the high precision pressure faces which eventually locate the blade under operational centrifugal force. The surface finish and waviness is critical throughout since discontinuities may lead to stress risers and fractures.

Both measuring tasks are difficult since the geometry is tight and contoured with poor access through the standard means of inspection profile or surface roughness instruments. By using the Sceptre System, and using high definition scanning, (ex: 12,000 points with a data point density of 5um and a 1mm per second scan speed with a 0.3mm probe tip), you



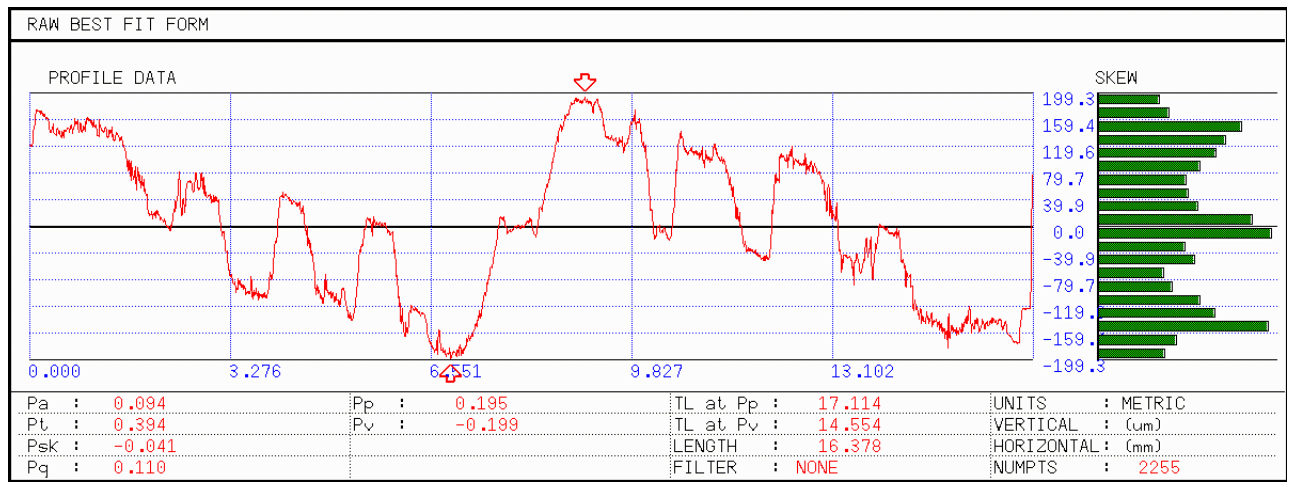
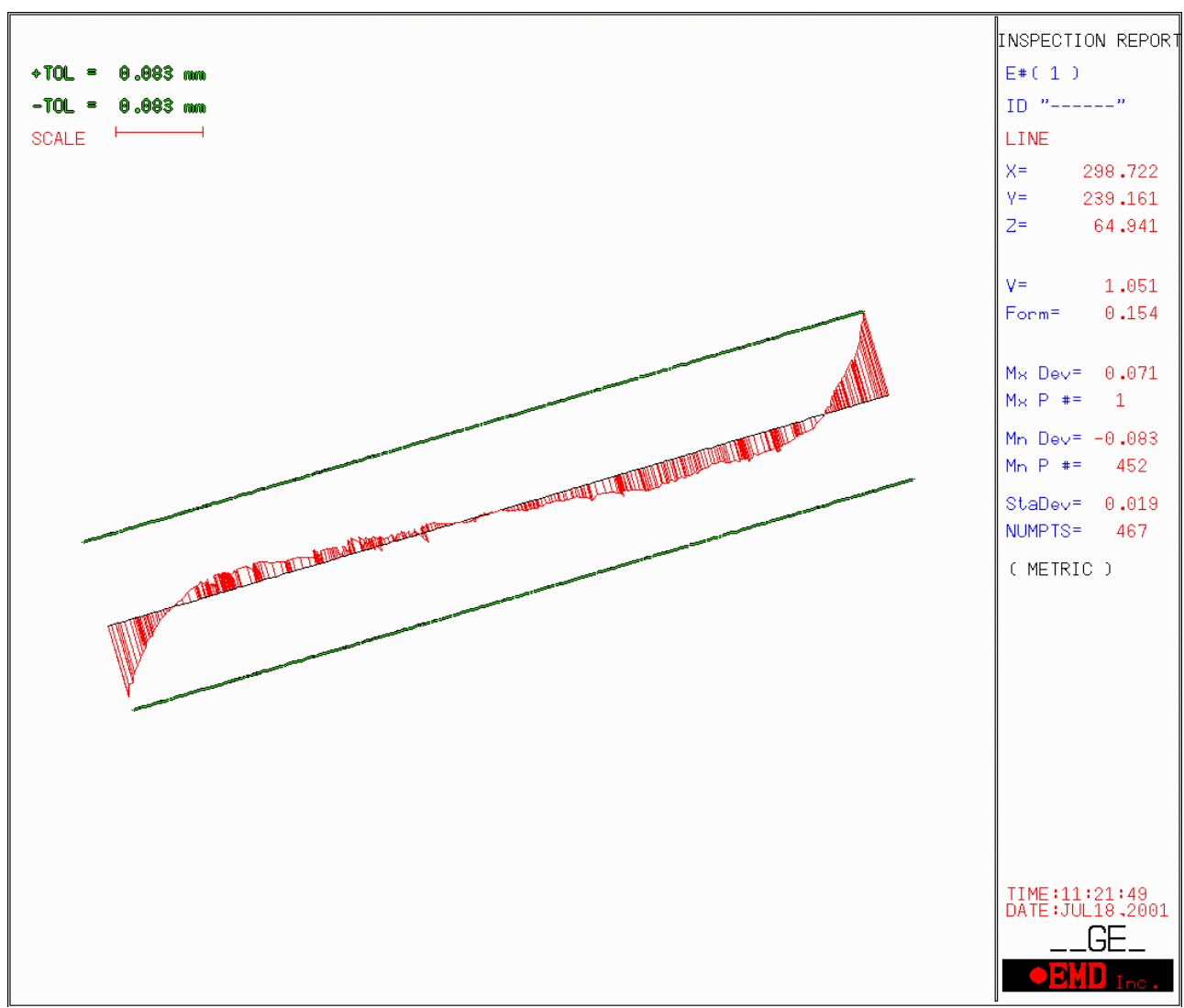
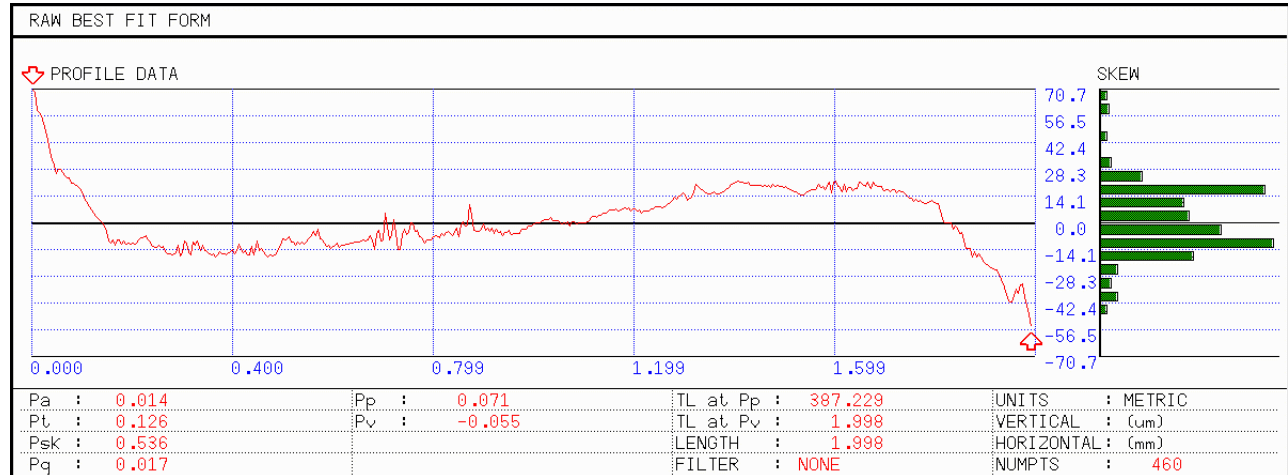


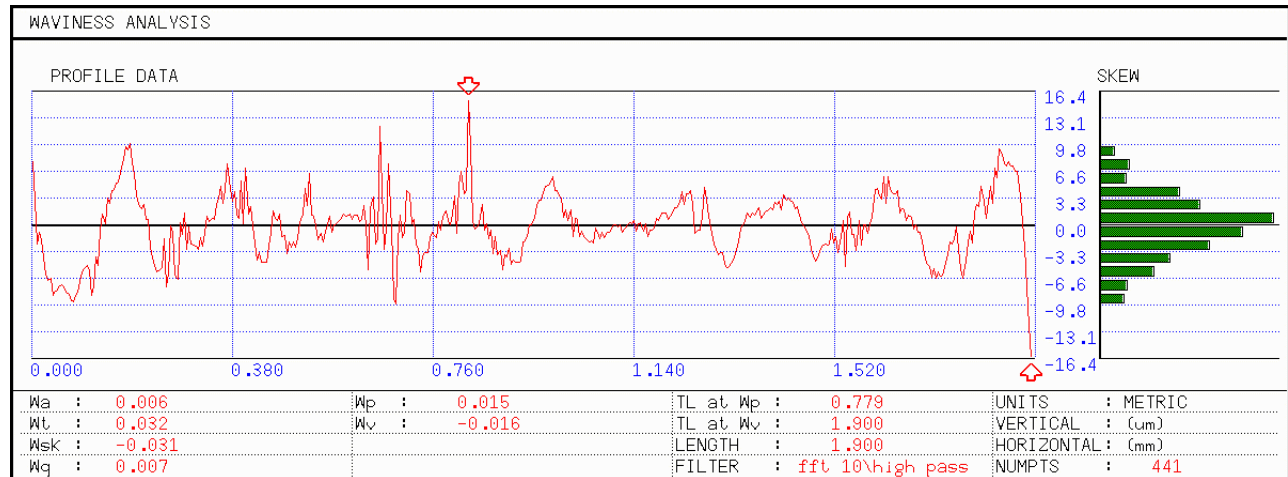
Figure 2 Chart Profile Representation



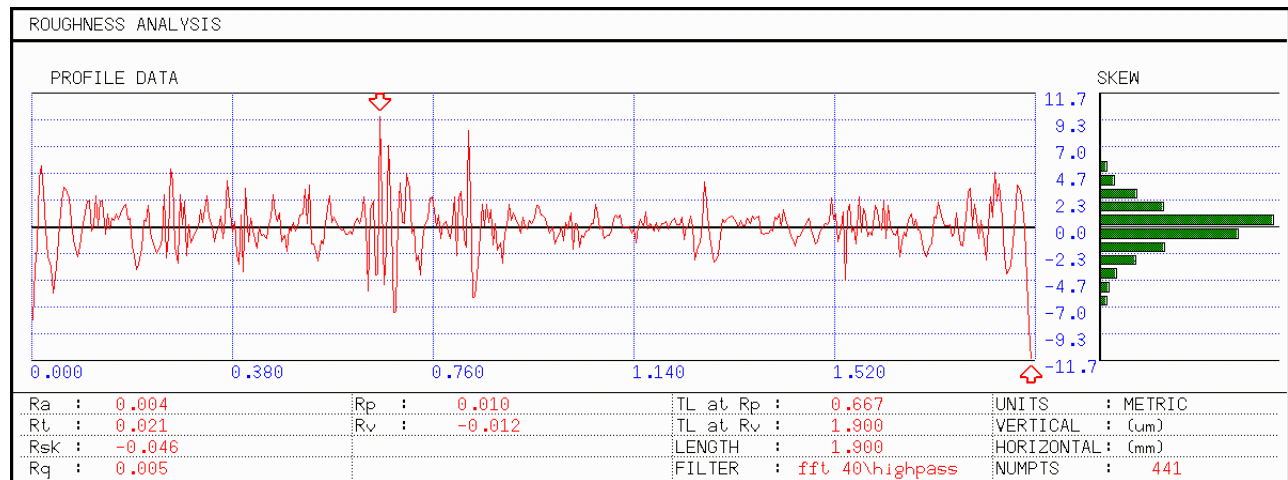
Isolate Single Pressure Face



Entire Profile



Waviness Evaluation with a High Pass Cut Off at 10 Cycles Per Data Set



Roughness Evaluation with a High Pass Cut Off at 40 Cycles Per Data Set