

Case study No. 6

Laser Rapid Process of Inspection Model for Casts of Aeroengines

1 Introduction

All the matching surfaces of the soleplates in by-pass air duct of the aeroengines are space surfaces. It's a very important problem to inspect the casts' surfaces quickly and effectively. Manual inspection is hard to actualize for its low precision and poor efficiency. Inspecting point by point with 3 coordinate measurer suffers the same problem of low efficiency. The popular method at present is test by model, namely check the surfaces with models of precision. This method is both easy and fast.

The No. 621 institute has ever made inspection models with SLS method, but failed for the material's unsteady. Yinhua Co. Has successively made the models with SSM method for the institute.

2 SSM technics

The SSM (Slicing Solid Manufacturing) technics manufactures models with coated paper, which has low inner stress, high steadiness, enough strength and rigidity. The models are almost non-moisture absorbing after proper treatment. Especially the high precision and low coarseness ensured the designed precision soundly.

The CAD models are designed with the UG-II, and then the CAD models are processed with the Larc'98 developed by Yinhua Co. to program the process. Last, they are manufactured with SSM process on M-RPMS-III equipment.

3 Technics data

Contour scanning speed: 300mm/s, gridding line speed: 500mm/s. CO₂ laser power: 35W, this will change according to the speed in processing. Coated paper: YHCP-1004 made by Yinhua Co. Press temperature: 90 °C. Thickness of paper with glue: 0.1mm.

4 Production

Yinhua Co. has made 18 inspection models till August, 1999. Fig 1, 2 shows some of them. These models have perfectly satisfied the demands of the institute.

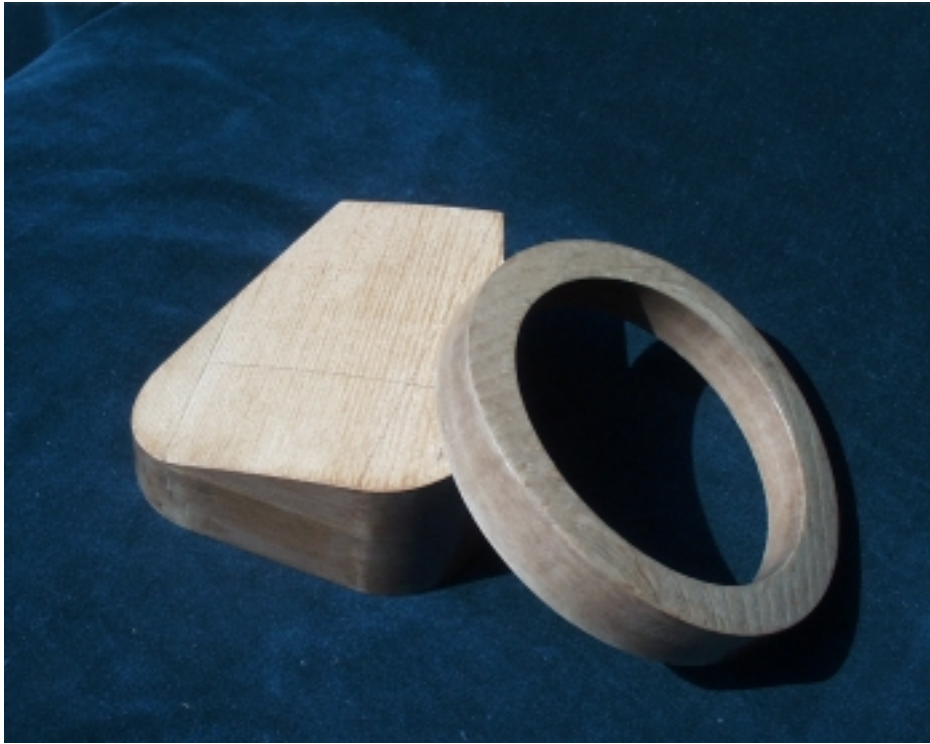


Fig 1

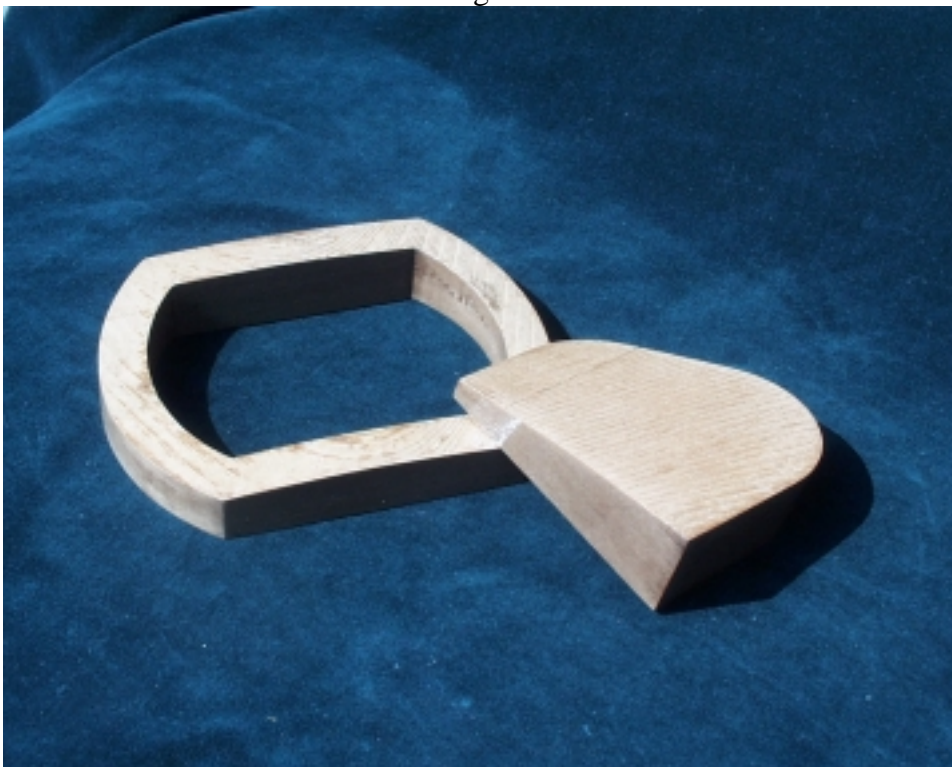


Fig 2