

FIXTURE FOR CRANKCASE BORING – V TYPE DIESEL ENGINE

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Abstract

Fixture used for machining of crank and cam bores of engines is called as 'Line Boring Fixture'. One of the most important and difficult machining operations is the machining of cylinder block head cam bores and cylinder block crank journals – the long, straight interrupted bores that provide support for cams and crankshafts, respectively. Such machining operation that form spaced coaxial bores of common diameter is known as line boring. In high volume automotive applications, forming interrupted line bores such as cylinder block crank bores and cylinder head cam bores is one of the most critical of machining operations. This is because crank journals and cam bores have large length to diameter (L/D) ratios and because tolerances must be held very close to minimize wear between a crank shaft and an engine block or a cam shaft in a cylinder head. This paper is focused on boring of pre-existing main bore and cam bore to achieve stringent dimensional and geometrical tolerances along with required surface finish. A line boring fixture is made with boring bars supported at the ends in bearings and carrying multiple single point boring tools. This fixture is designed and manufactured for Diesel V Engines. Layout of the fixture along with details of identified critical components is given in the paper. The paper concludes with results of crankcases manufactured on the fixture. Results demonstrated that the main bore and cam bore sizes are within specified tolerance limits. It is shown that the roundness of the bores is within the tolerance limits for all types of crankcases. The proposed line boring method helps achieve required tolerances on the V engine crankcase.

Keywords : Line Boring; Crankcase; Geometrical and dimensional tolerances; V engine; Precision machining.