An Automatic Cost Calculation System for 3-D Laser Cutting Based on Characteristic Numbers

M. Masur[a], F. Liébana[b] and U. Stute[c]

Laser Zentrum Hannover e.V., Hollerithallee 8, 30419 Hannover, Germany

[a]mm@lzh.de, [b]fl@lzh.de, [c]st@lzh.de

Keywords: computer automated process, laser cutting, cost planning

Abstract. At present, small and medium-sized enterprises (SME) in the sheet metal industry performing 3-d laser cutting have to invest a considerable amount of time in offer preparation, although there is a low probability of obtaining the order. The offer calculation is mostly done manually and rapidly, as estimation. For example, the length of the contours to be cut are extracted from drawings and summed up. The actual production time for problem areas of the workpiece geometry like sharp angles and narrow radii can only be calculated by a post-processor simulation, or by a comparison with a similar workpiece that was manufactured before. This complicates the cost calculation and adds an unknown factor to it. Therefore, only experienced employees can estimate the costs for the cutting of 3-d workpieces. The aim of the proposed automatic cost calculation algorithm is the quick machining time calculation for 3-d laser cutting. Less experienced persons should be able to use a pre-configured tool. Characteristic numbers are generated on the basis of the workpiece geometry. They describe all necessary machine work that is required to manufacture the current workpiece. In a next step, the dynamic machine behaviour for these problem areas needs to be examined. It is projected to specific machine parameters. As example the acceleration and the maximum cutting velocity are basic parameters. By connecting the characteristic numbers with the machine parameters, the machining time for a specific machine is calculated. This machining time is an important factor for the cost calculation. The characteristic numbers can also be used to find similar workpieces within a database. This database contains existing and already evaluated offers. As a plausibility check the user can search for similar offers and compare them with the currently prepared one.