

# Force Measurements for Single Point Incremental Forming: an Experimental Study

J.R. Duflou<sup>a</sup>, A. Szekeres<sup>b</sup> and P. Vanherck<sup>c</sup>

Department of Mechanical Engineering, Katholieke Universiteit Leuven,  
Celestijnenlaan 300B, 3001 Heverlee, Belgium

<sup>a</sup>Joost.Duflou@mech.kuleuven.ac.be, <sup>b</sup>Alexander.Szekeres@mech.kuleuven.ac.be,

<sup>c</sup>Paul.Vanherck@mech.kuleuven.ac.be

**Keywords:** force, prototyping, incremental

**Abstract.** In this paper an experimental platform capable of measuring forces in process during an incremental forming procedure is described and the results garnered from it are presented. Some of the earliest measurements of forces in incremental forming and the changes induced on the measured load are reported. Using a table type force dynamometer with incremental forming fixture mounted on top, three components of force were measured throughout the forming process. They were found to vary as the parts were made. The reported experimental test program was focused on the influence of three different process parameters on the forming forces: the vertical step size between consecutive contours, the diameter of the tool and the steepness of the part's wall. For the tested material, analytical results demonstrating the relationship between the respective process parameters and the induced forces are presented in this paper.