

EDITORIAL TO THE THEMATIC ISSUE

ADVANCED MACHINING TECHNOLOGIES

Global competitiveness will be the challenge for all manufacturing companies, whether they are situated in high-wage or low-wage countries. These manufacturing plants will only have a future, if they are able to meet the demands of the customer concerning:

- costs
 - quality
 - and delivery time
- at the “best in class” level.

The Institute of Production Management, Technology and Machine Tools (PTW) at Technische Universität Darmstadt aims for helping companies to improve their production technology and production methods.

The main research fields of the PTW are:

- New machine tool concepts
 - Spindle technology
 - Reconfigurable machine tools
 - Machining with low-cost robots
- Technology
 - New drilling technologies for high quality bore holes
 - Machining of cast iron using PKD
 - High Speed Cutting (HSC)
- Production Management
 - Process learning factory for lean manufacturing
- Environmental research related to production
 - Reducing energy consumption in production/machine tool
 - Optimizing resources in process-chains

For the education of students and the staff of industry, the PTW has built up a so-called process learning factory, which was opened June 2007 (see Figure 1).

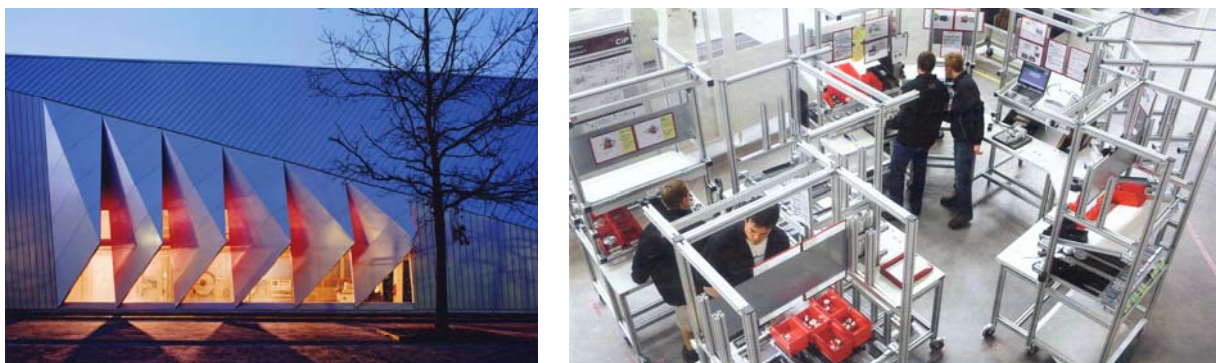


Figure 1: Process learning factory at PTW.

The first contribution “TRIANGULAR HOLES – ORIGINATION, IDENTIFICATION, AND INFLUENCING PARAMETERS” deals with the scientific issue of the unwanted manufacturing triangular instead of circular holes using twisted carbide drills.

The paper “MANUFACTURING PROCESS FOR EDGE PREPARATION OF SHEET METAL” is on the use of Ultra-High-Speed Machining technology and its implementation into a sheet metal forming process. For a continuous milling process to manufacture a defined coil edge, new processes are necessary to enable milling at a feed rate of up to 80.000 mm/min.

The contribution entitled “PROCESS ANALYSIS AND HOLE QUALITY OF CROSS-DRILLED HOLES” picks the manufacturing process of drilling into a pre-fabricated hole as a central theme. This topic has rarely been analysed scientifically however is of increasing importance in industry.

The paper “HIGH SPEED MILLING OF TITANIUM ALLOYS” gives an overview over the machinability of titanium alloys at high cutting speeds. This will be a central research topic in the future since the amount of titanium to be machined is rapidly increasing.

The last contribution “DRY MACHINING USING NOVEL CHROMIUM BASED COATINGS” analyses the usability of newly developed titanium free tool coatings for dry machining purposes. The use of tool coatings is one of the enabling disciplines for a environmental friendly production.

These five contributions give a good overview of the research activities in the field of machine tools and technology making full use of the PTW lab, which is equipped with newest machine tools and measuring devices (see Figure 2). The main focus of all papers are advanced machining technologies, which has been the strategic orientation of the PTW ever since.



Figure 2: Research lab at PTW.

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