MANUFACTURING & AUTOMATION RESEARCH CENTER

KOÇ UNIVERSITY

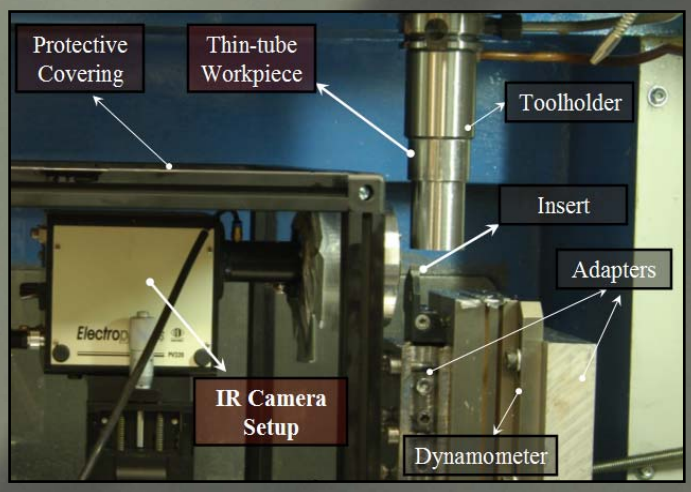
# Analysis of Thermal Fields in Orthogonal Machining

## Motivation:

The prediction of temperature distribution is very important in determining the maximum speed that gives the most optimal material removal rate without excessive tool wear.

The residual stresses in the workpiece can be predicted with the knowledge of the temperature distribution.

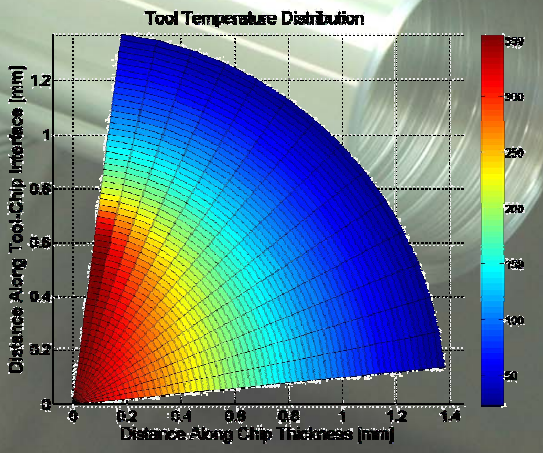
With an accurate temperature prediction, the surface errors caused by thermal deformation of the cutting tool can be compansated.

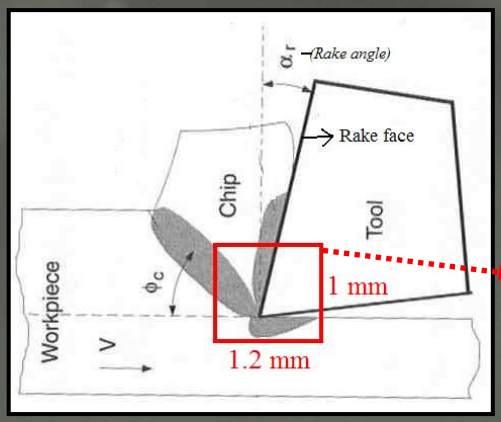


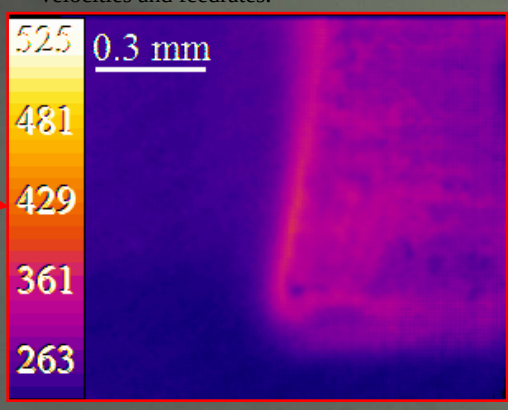

## Research:

The validation of a previously developed finite-difference temperature prediction model is carried out for orthogonal machining process with an IR camera setup, considering the maximum and the mean temperature in the tool-chip interface zone and the temperature distribution on the tool rake face.

A total number of 64 experiments are conducted with three different materials; Al 7075, AISI 1050 steel, AISI H13 steel, two different tool geometries; inserts having a rake angle of 6 and 18 degrees, and for different cutting velocities and feedrates.




*Supported by*

TÜBİTAK

*Associate Prof. İsmail Lazoğlu*

*Manufacturing and Automation Research Center*
*Koc University*

*Rumeli Feneri Yolu*
*Sariyer, Istanbul 34450*

*Phone: +90 (212) 338-1587*
*Fax: +90 (212) 338-1548*
*E-mail: ilazoglu@ku.edu.tr*

*Web: http://marc.ku.edu.tr*

*Research Assistant*
*Cenk Dinç*
*E-mail: cdinc@ku.edu.tr*