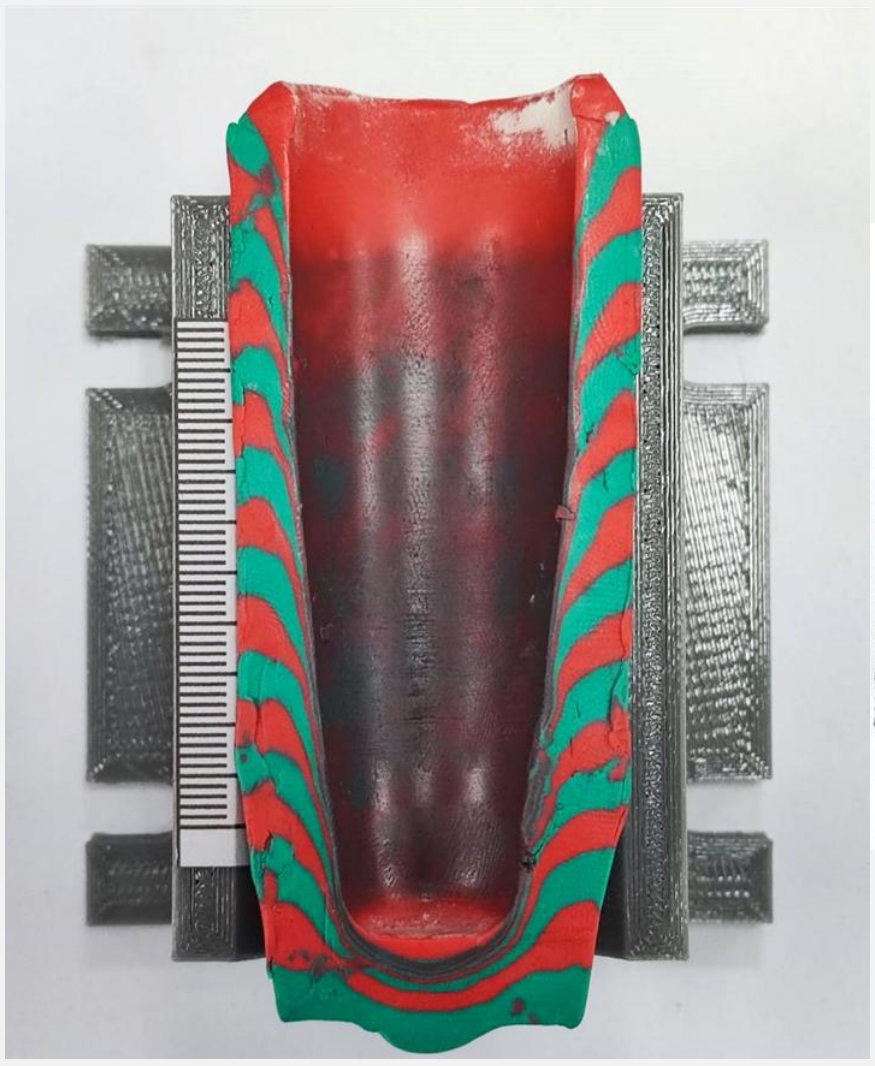
Presented by Mr. Nara Nakeenopakun
Advisor: Assoc. Prof. Dr. Yingyot Aue-u-lan

PhD. Dissertation Defend Examination

# Development of the Physical Modeling Technique for Forging Process Design



## Highlight

This research highlights an alternative method to overcome the FEM simulation's limitation (severe mesh distortion) by using a physical modeling technique (PMT). The study comprises two main parts:

1. Development of novel forming technique, called " combined bulging-piercing technique", aims to reduce the forming load for manufacturing of a semi-semi hollow stepped shat. The focus is to minimizing forming load and controlling thickness variation. This design is then validated using FEM simulation, the physical modeling technique, and experiments.
2. The physical modeling technique for investigation of back-end defect formation in forward extrusion of a rectangular profile, where FEM simulation typically faces convergence problem due to severe mesh deformation. This involves validating PMT (using gridded materials, characterized flow stress, and friction testing) against FEM before its experimental application to specifically address this FEM limitation.

This integrated approach leverages the quantitative prediction power of FEM simulation with the qualitative and large-deformation analysis capability of PMT to create a more robust and comprehensive methodology for forging process design.

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| **Wed 26th, NOV 2025** | **10.00 – 12.00 A.M.** | **TGGS, 6th floor, Room 607** |