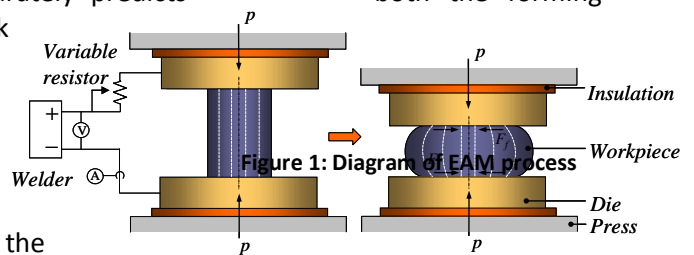


## Improved Electrically Assisted Manufacturing Techniques

### Description:

There is a current need for improved lightweight materials within the automotive and aerospace industries to improve fuel economy, material durability and strength, and improve performance which can be addressed using lightweight metals such as aluminum, titanium, and magnesium. Unfortunately, the manufacturability is limited by the strength and formability of these materials and can be difficult to achieve using traditional manufacturing methods. Electrically-Assisted Manufacturing (EAM) is an emerging manufacturing technique in which electricity is applied to a part undergoing deformation in processes. However, EAM has not previously been able to be modeled and predicted, thus only allowing implementation through a trial and error method, therefore limiting industry adoption.

Technology developed at Clemson University, accurately predicts both the forming loads and thermal characteristics of a metal work piece as it is being deformed using the new Electrically Assisted Manufacturing (EAM) technique and provides a methodology for the control of a manufacturing process by applying a direct electrical current through a metallic work piece, concurrently with the mechanical process, in order to modify the material flow characteristic. The EAM technique has been proven experimentally, but it is not feasible to be used in industry because there is currently no way to predict force/thermal aspects without costly and time-consuming trial-and-error processes. The algorithms used in this novel modeling approach can provide an analytical model for prediction of EAM processes such as forging, bending, stretch forming, and any other applicable processes.



### Applications:

- Automotive and Aerospace materials
- Other industries benefitting from lightweight materials

### Benefits:

- Improved prediction of EAM processes
- Increased likelihood of industry adoption
- Increased manufacturability

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**Licensing Status:** Available for licensing  
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