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Author: Evandro Paese Martin Geier Roberto P. Homrich  
Pedro Rosa Rodrigo Rossi



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# Sheet metal electromagnetic forming using a flat spiral coil: experiments, modeling, and validation

Evandro Paese<sup>a,\*</sup>, Martin Geier<sup>b</sup>, Roberto P. Homrich<sup>c</sup>, Pedro Rosa<sup>d</sup>,  
Rodrigo Rossi<sup>e</sup>

<sup>a</sup>*Departamento de Engenharia Mecânica, Universidade de Caxias Sul, Campus  
Universitário da Região dos Vinhedos, Rua Alameda João Dal Sasso, 800, Bento  
Gonçalves, RS, 95700-000, Brazil.*

<sup>b</sup>*Engenharia Mecânica, Escola Politécnica, Universidade do Vale do Rio dos Sinos, Av.  
Unisinos, 950, São Leopoldo, RS, 93.022-750, Brazil.*

<sup>c</sup>*Departamento de Engenharia Elétrica, Universidade Federal do Rio Grande do Sul, Rua  
Osvaldo Aranha, 103, Porto Alegre, RS, 90035-190, Brazil.*

<sup>d</sup>*IDMEC, Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais N1,  
1049-001, Lisboa, Portugal.*

<sup>e</sup>*Departamento de Engenharia Mecânica, Universidade Federal do Rio Grande do Sul,  
Rua Sarmiento Leite, 425, Porto Alegre, RS, 90046-902, Brazil.*

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## Abstract

In this paper, we present a novel study on electromagnetic forming (EMF) comprises experiments, modeling, and validation. Free bulging of aluminum sheet metals was performed in an instrumented SMU1500 EMF machine for a range of energies using a custom-made die tool. Special regard is given to the description of the materials and methods in the experimental phase and in the validation of the proposed model during the modeling stage. An enhanced model that couples electrical and magnetic phenomena is proposed, aiming to compute the electromagnetic forces (which are subsequently used) into a mechanical uncoupled simulation, to predict the sheet movement via a finite element method. The experimental results had a satisfactory agreement with the calculated and simulated predictions, establishing the significance of this analysis method. The experimental validation carried out highlights

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\*Corresponding author. Phone: +55 54 3449-5200

*Email addresses:* epaese@terra.com.br (Evandro Paese),  
geier.martin@gmail.com (Martin Geier), roberto.homrich@ufrgs.br (Roberto P.  
Homrich), pedro.rosa@tecnico.ulisboa.pt (Pedro Rosa), rrossi@ufrgs.br (Rodrigo  
Rossi)

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