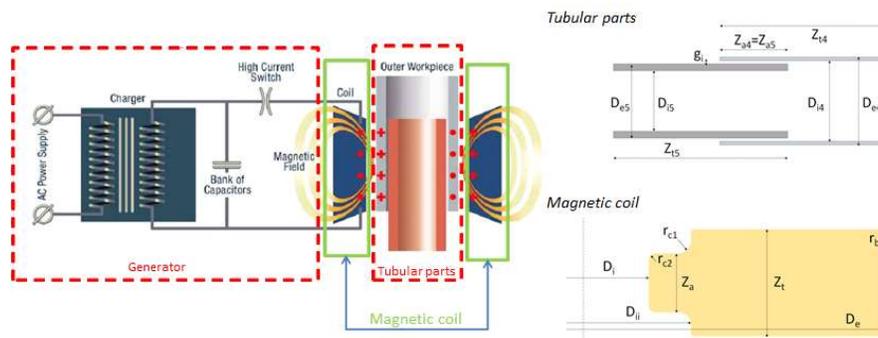


 	<p><b>DEVELOPMENT OF A SIMPLE CALCULATION TOOL DEDICATED TO THE PULSED MAGNETO-FORMING, CRIMPING AND WELDING OF TUBES</b></p> <p><b>INTERNSHIP - RESEARCH</b></p> <p><b>ESIEE</b> AMIENS <b>O. MALOBERTI</b></p>	<p>14</p> <p><b>2020/2021</b></p>
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**DOMAIN :** Electromechanical effects, Electrical Engineering, Algorithms, Mathematics for Engineers, VBA language and Open Office Calculation software or Excel Software.

**TOPIC (anglais) :** The INDUXIAL factory produces and makes assemblies of tubular parts dedicated to aeronautic applications. The factory would like to investigate the possibility to realize such assemblies by means of the magnetic pulse technology. To do so, it is first necessary to be able to estimate the feasibility and main performances of such a tool designed and optimized for this need. The induction problems concerning the magnetic pulse technology takes profit from the Lorentz force effects that the oscillating magnetic field produces in the skin depth of a metal in which eddy currents are induced. A first stake is the inclusion of the skin effect into the electrical parameters (resistance R, inductance L, capacitance ...). The second stake is the correct evaluation of the Lorentz force through the fields, the currents and equivalent force coefficients K. Finally, the last stake is the prediction of the resulting deformation, speed of deformation and assembling feasibility. The ESIEE proposes an analytical method in order to first calculate the electromagnetic fields and current densities and so the main electrical and electromechanical parameters. It is then possible to deduce the current-voltage pulse relationship in an inductor used in the magneto-forming technology by coupling to an equivalent electrical circuit. We finally propose a simple mechanical coupling way to estimate the deformation while the coil is submitted to the current pulse. **The aim of this internship is to validate and implement a calculation tool in Excel, that will use the most simplified version of the model, in order to deduce the main properties (R, L, K), characteristics (losses, efficiency, approximate life time) and performances (maximum force, pressure, deformation, speed of deformation, ...) of the induction coil. The tool will be used by a technological platform (PFT innovaltch) and supported and developed by the ESIEE Amiens.**



**MISSIONS :**

- Tutorials on VBA languages and the development of simple Excel Calculator applications,
- Learn how to use the electromagnetic and mechanical coupled models,
- **Build a database** for electromagnetic and mechanical properties of materials,
- **Validate and implement** the calculation tool written with VBA on Excel Calculator,
- Write a scientific and technical report.

**RESULTS, MODELS AND EQUIPMENT AT DISPOSAL :**

Electromagnetic models of the bulk one turn and multi-turn induction coil / Softwares: MATLAB, MATAB/SIMULINK, SCILAB, EXCEL and Open Office Calculator.

**PROFESSIONAL PROFILE :** Computer Science, VBA developers / **Bac + 4 - DURATION :** 3-6 month

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