



UNIVERSIDADE
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Colóquio da Faculdade de Engenharia

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Fabrico de Produtos Sustentáveis Aplicando Técnicas de Simulação e de Controlo das Tensões Residuais em Operações de Maquinagem

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(FE UCP)

Resumo: Designing and manufacturing sustainable products through increased product lifetime is a major challenge to the manufacturing industry. The product lifetime heavily depends on the applied loading conditions in service. For many critical applications such as those used in power generation, aerospace, chemical and automotive industries these loading conditions are characterized by cyclic loadings (fatigue), high temperatures, stress corrosion cracking or combined actions on manufactured components. The severity of the loading conditions that a given product can withstand in service depends on its surface integrity, which includes the residual stresses. As known, compressive residual stresses can increase the lifetime of the components, and thus, higher product sustainability. These compressive residual stresses are frequently introduced deliberately by applying mechanical, thermal and thermo-chemical surface treatment processes, such as deep rolling, low plasticity burnishing, shot peening, laser shock peening and carbo-nitriding. However, such processes are expensive and time consuming.

This presentation will show the importance of measuring and modeling of the influence of machining conditions on the residual stresses produced on machined components. This study allows developing a number of feasible means to control the residual stresses during manufacturing. A proper control of the machining conditions can reduce the level of tensile residual stresses in machining components or even induce the more desirable compressive residual stresses. This control allows us to reduce the application of post-surface treatment processes, and in certain cases they can be even eliminated.

Nota biográfica: Dr. J. C. Outeiro received his PhD in Manufacturing Engineering from the University of Coimbra (Coimbra, Portugal) in 2003. Dr. Outeiro is a professor at the Portuguese Catholic University since 1995. Dr. Outeiro has been involved in several machining projects in cooperation with several Academic and Industrial partners in Europe and United States. The main research interest of Dr. Outeiro is the optimization of machining operations with special emphasis on the quality of the machined components. His work is published in several peer-reviewed scientific journals and conference proceedings on machining related research topics.

HORÁRIO: 13:30–14:00 café, 14:00–15:00 palestra

LOCAL: Anfiteatro 12-A da Faculdade de Engenharia, Campus de Sintra

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