Fabricación Aditiva

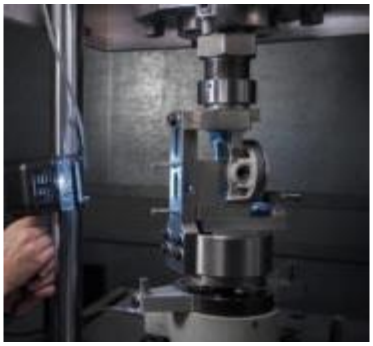
BOLETÍN DE VIGILANCIA TECNOLÓGICA.
JULIO-SEPTIEMBRE 2020. **CEIIA**

NOTICIAS

13/07/2020

Additive manufactured pistons for Porsche

The use of additive manufacturing for highly stressed engine components has been an area of considerable research in recent years. The flexibility of the technology facilitates design features that would be impossible to achieve using traditional manufacturing techniques. However, ensuring the material properties of a finished part are sufficiently robust has proved to be a stumbling block, not least in ensuring consistency from batch to batch, which is highly dependent on a plethora of parameters during the manufacturing process.



https://www.enginetechnologyinternational.com/videos/additive-manufactured-pistons-for-porsche.html

05/08/2020

Directing GM's 3D-printed future

Q&A with Kevin Quinn, GM's additive design and manufacturing director.

https://www.sae.org/news/2020/08/directing-gm%E2%80%99s-3d-printed-future

05/08/2020

US Air Force produces first 3D-printed metal part for aircraft engines

The service reverse engineered and reproduced an anti-ice gasket for the Pratt & Whitney TF33-P103, a turbofan engine which powers the Boeing E-3 Sentry, the Boeing B-52 Stratofortress and the Northrop Grumman E-8.

https://www.flightglobal.com/fixed-wing/us-air-force-produces-first-3d-printed-metal-part-for-aircraft-engines/139643.article

PUBLICACIONES CIENTÍFICAS

Septiembre/2020

A Review of the Application of Additive Manufacturing in Prosthetic and Orthotic Clinics from a Biomechanical Perspective

Yan Wang, Qitao Tan, Fang Pu, David Boone, Ming Zhang

Prostheses and orthoses are common assistive devices to meet the biomechanical needs of people with physical disabilities. The traditional fabrication approach for prostheses or orthoses is a material-wasting, time-consuming, and labor-intensive process. Additive manufacturing (AM) technology has advantages that can solve these problems. Many trials have been conducted in fabricating prostheses and orthoses. However, there is still a gap between the hype and the expected realities of AM in prosthetic and orthotic clinics. One of the key challenges is the lack of a systematic framework of integrated technologies with the AM procedure; another challenge is the need to design a prosthetic or orthotic product that can meet the requirements of both comfort and function. This study reviews the current state of application of AM technologies in prosthesis and orthosis fabrication, and discusses optimal design using computational methods and biomechanical evaluations of product performance. A systematic framework of the AM procedure is proposed, which covers the scanning of affected body parts through to the final designed adaptable product. A cycle of optimal design and biomechanical evaluation of products using finite-element analysis is included in the framework. A mature framework of the AM procedure and sufficient evidence that the resulting products show satisfactory biomechanical performance will promote the application of AM in prosthetic and orthotic clinics.

https://www.sciencedirect.com/science/article/pii/S2095809920302575

Septiembre/2020

Geometric tolerance and manufacturing assemblability estimation of metal additive manufacturing (AM) processes

Baltej Singh Rupal, Nabil Answer, Marc Secanell, Ahmed Jawad Qureshi

Metal additive manufacturing (AM) has become a predominant process for manufacturing complex metal parts. However, research on controlling the geometric tolerances of the metal AM printed parts and assemblies is scarce. This paper presents a methodology to conduct a geometric tolerance and manufacturing assemblability study of the parts manufactured by metal AM. An assembly benchmark test artifact (ABTA) is designed to include mating features with given assembly conditions based on geometric tolerancing quantifiers. For virtual analysis, prediction phase ABTA samples are generated by using systematic and random field theory deviations. The prediction phase deviations are then calibrated using deviations from a numerical simulation based on thermo-mechanical finite element model of the part. These samples or 'skin model shapes' are subjected to geometric tolerance and assemblability study. For experimental validation of the method, geometric tolerance quantification and actual assembly was conducted on laser powder bed fusion (LPBF) fabricated parts. The comparative analysis of the experimental and virtual results validates the new methodology and its ability to provide reliable information regarding assemblability, size dimensions and geometric tolerances. The method can be extended to any AM process for performing a virtual tolerance and manufacturing assemblability study.

https://www.sciencedirect.com/science/article/pii/S0264127520303762

Septiembre/2020

An Industry 4.0 framework for tooling production using metal additive manufacturing-based first-time-right smart manufacturing system

Mandaná Moshiri, Amal Charles, Ahmed Elkaseer, Steffen Scholzb, Sankhya Mohanty, Guido Tosello

This paper presents a concept for an integrated process chain for tooling production based on metal additive manufacturing. The proposed approach aims at taking advantage of a fully digitized production line, describing the main steps for the synergetic integration of the manufacturing assets. The production line entails digital infrastructure that collects and elaborate data from various monitoring sensors to execute corrective actions and continuously optimize the process. This line will bring breakthrough benefits, like flexibility and full traceability. Also challenges, as change management in the industry, skills gap, the requirement of new business models and product re-design have been addressed.

https://www.sciencedirect.com/science/article/pii/S2212827120310271