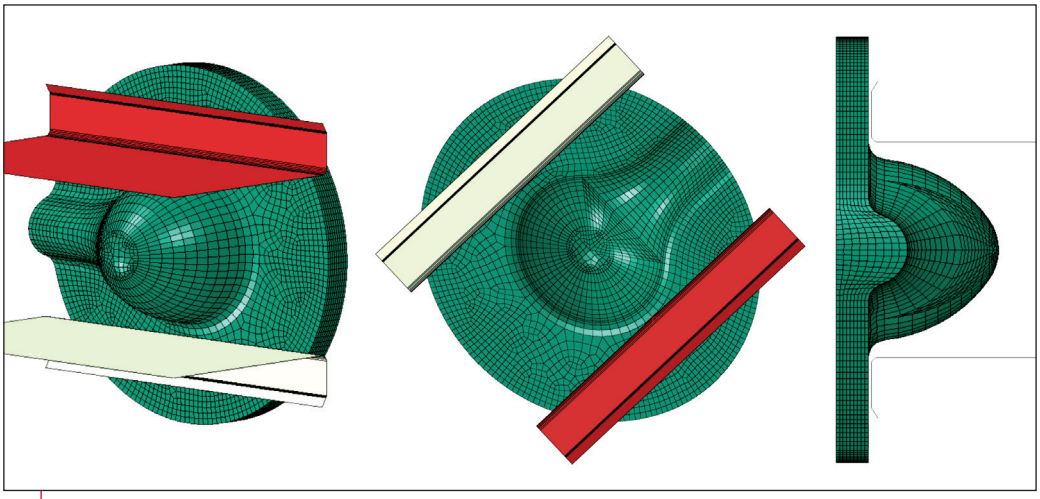
Medical equipment

GE Healthcare

Numerical simulation to improve mammography

GE Healthcare wants to make the behaviour of mammography units less traumatising for patients. For this purpose, GE Healthcare has used digital simulation in order to reduce mechanical stresses applied on the breast during the examination.



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OUR CLIENT

Corporate name
GE Healthcare

Activity
A world leader in manufacturing of medical imaging equipment. GE Healthcare is based in Buc (Yvelines, France) and its European head office includes an R&D centre which employs 400 staff

Sales turnover
Approximately 14 billion euros

In order to obtain good mammograms, the breast must be flattened between two rigid plates to achieve uniform thickness and spread out the internal structures of the organ. Hence the need to apply pressure, which is tolerated to varying degrees by women. Reducing stresses in the breast would make this radiological examination less traumatising for patients. This is what GE Healthcare is striving for. However, organising a test campaign on women, during which different compression modes would be applied, results far too long and complex.

"We have asked Cetim to design a numerical approach of breast compression during the mammography and to use numerical simulation to understand how the loads in the breast are distributed depending on the compression modes applied", explains Serge Muller, applied research manager in breast imaging at GE Healthcare.

Simulating shape and tissues

This simulation requires creating several numerical models taking into account the shape of different types of breasts and the mechanical characteristics of the living tissues which constitute them. Data concerning the behaviour of the skin, fat and mammary gland have been used with breast numerical images obtained during mammography (compressed breasts), then during an MRI examination (uncompressed breasts).

The effects of breast compression were simulated numerically, which helped to understand how the stresses are distributed and how they vary depending on the compression plate displacement conditions. GE Healthcare has now launched a new battle: find the correspondence between the stresses and the perception of pain. And Cetim is meeting the challenge!

Cetim's asset

Cetim is implementing technical skills including design and numerical simulation to help industrialists understand and improve the behaviour of a complex mechanical system. Cetim's range of expertise also applies in various biomechanical fields.

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