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Identification of the ball screw load distribution by photoelasticity
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Ball screw activated by a hydraulic engine.

THSA : RATIER command system of the horizontal plan of Airbus A320 A330.

Mesh: 2-D calculation
- 26637 element
- 16858 nodes

FEM software:
- ZebulonTM

Boundaries conditions:
- Screw displacement imposed.
- Trunnion unbending.
- Friction coefficient 0,2.

Load = 1.0e5 N

Profile ball-groove

Experimental set-up

Experimental PMMA specimen

Polariscope

OK

PMMA specimen Realized at IUT Figeac by A. Fermy.

Realized at IUT Figeac by A. Fermy.

• Conclusion :
  ➢ The photoelasticity is a good measurement method for the load distribution in the ball screw system in 2-D.
  ➢ The calculation of fringe realized thanks to simulation results allows to obtain similar fringes to the one obtained by the experimental tries.
• Under work :
  ➢ Realization of 3-D experimental photoelasticity measurement based on cutting optics for a ball bearing in a first time and for the 3-D ball screw with LMS photomecanic team of Poitiers.

PRINCIPLE OF THE BALLS SCREW

➢ Transform a movement of rotation into a translator movement with a best mechanical efficiency, that is with a minimum of friction.
➢ Use of balls enters the screw and the nut to pass on the power in rotation, what increases the efficiency as well as the yield.
➢ Mechanism of recovery of balls when they reach the end of the nut.

CONCLUSION AND FUTURE WORKS