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	SMECm		
Calculs linéaires comparatif de deux type de Pivots Flexibles Comparative linear FEA of two different Flex Pivots			

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1. Scope

This document gives results of FEA implemented on two different Flex Pivot, to show deformed shapes just before buckling threshold.

2. Softwares

The F.E.A. as been done with CosmosWorks 6.0 and CAD solid model constructed in SolidWorks2000.

This software package is limited to linear analysis, and doesn't allow volumic and shell elements merging.

3. Definition of pivots

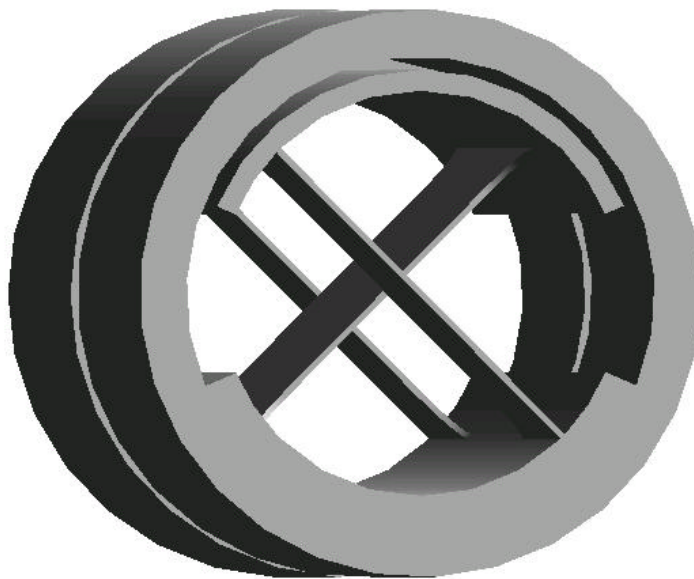
The two pivots we compared are :

- 5012-800 Stainless steel pivot from TRW
- Diam. 11 pivot from BE System, with 0.1 mm CuBe blades.

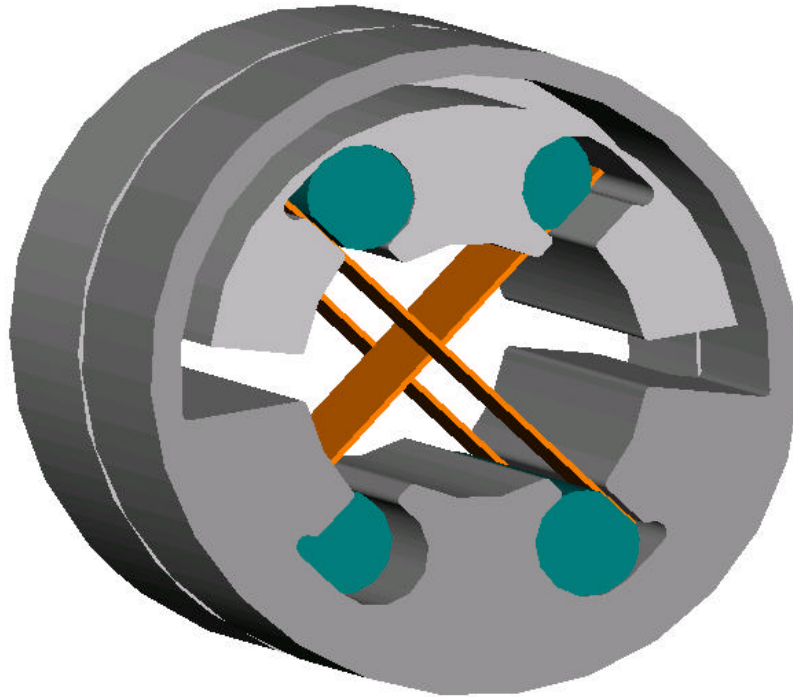
They have almost **same torsion stiffness : 0.037 Nm/rad**

BE System pivot is 21 mm long, and his weight is about 12 gr.

TRW is smaller (9.52 mm diameter, and 15.24 mm length) and lighter (about 4 gr)



TRW Pivots frames and blades are made of same Stainless steel. Blades are brazed.



BE System pivots are made of AISI 316L frame and CuBe2 blades, clamped by wedges.

Ultimate shear force is given by suppliers : 35 N for TRW, and 150 N for BE System.

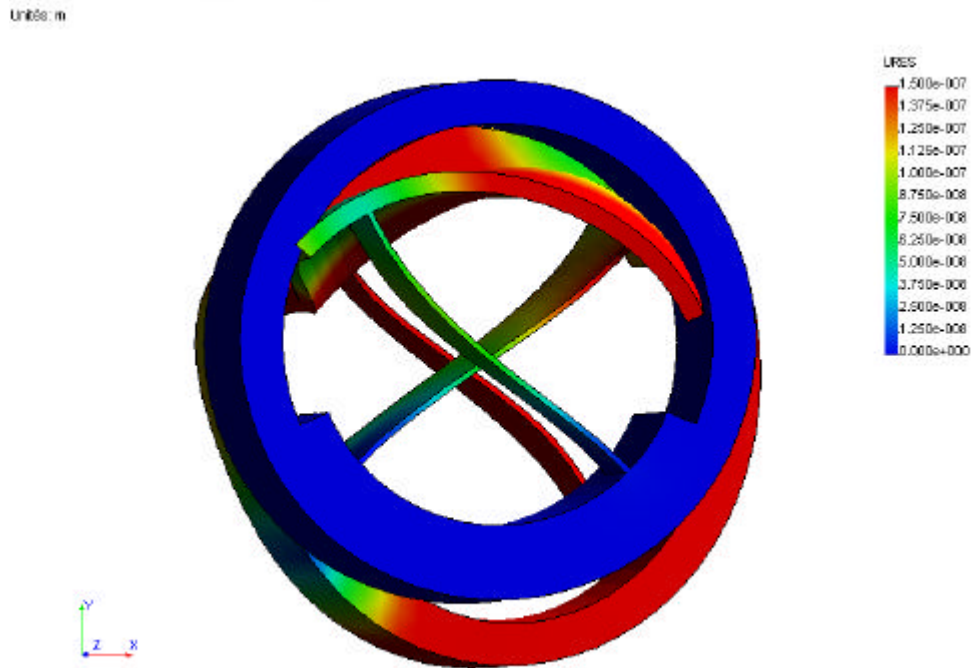
4. Boundary conditions

For both pivot, we fix all nodes on first ring, and prevent rotation of second ring.

Load is 35 N, applied on second ring, parallele to smaller blades

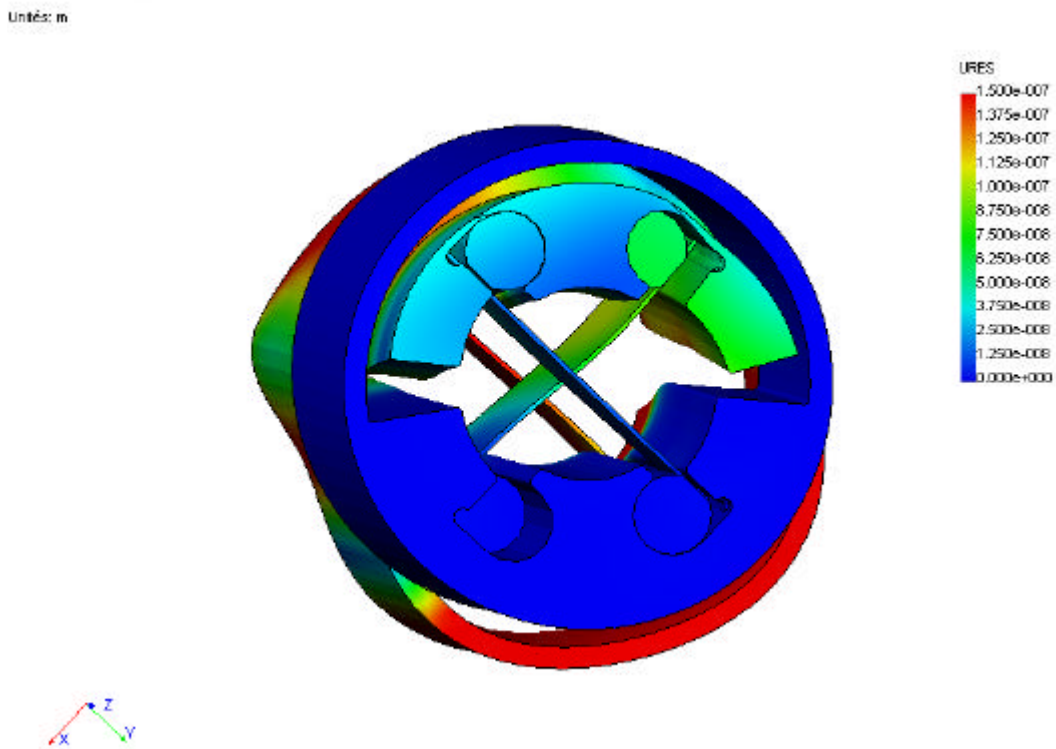
5. Results

TRW :



We can see that under a load parallele to blades, the frame is deflected in torsion and blades are sensitive to buckling limit loads.

BE System :



We can see, with same color scale and same factor of deflection, that stiffer frame holds blades to higher limits with respect to buckling.