

## THE STUDY OF COMPRESSIVE STRESS AND DEFORMATION FOR THE ELEMENTS OF FRICTION COUPLE FOR THE BRAKES WITH AXIAL MOVEMENT

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**Abstract** The paper does the part from a series research to the substitution of the block brakes from the machines of mining extraction with brakes with axial movement( brakes with disks) and he does advert to the machine of extraction 2T3000X1500 produced by UNIO Satu Mare. With this end in view I am analyzed the elements of friction couple with help of the method with finite element

**Key words:** friction disk, wearing plate, pad, finite element, compressive stress, deformation

### 1.THE PRESENTATION OF BRAKE SYSTEM

The presentation of suggested brake system falls into two friction disks made from OL37 having the outside diameter of 3600mm, the thickness of 40mm and the ray of braking of 1700mm. To each friction disk acts 32 of formal plates circular letter having the diameter of 110mm (fig. 1) driven hydraulic. The system assures a maximum braking moment of 40500 daN m. Brake drum of the machine of extraction has a diameter of 3000mm and is able to raise a task a maxim of 14000 daN.

The friction disks and the plates are made from OL37, and the plates are lined with friction material becorit.

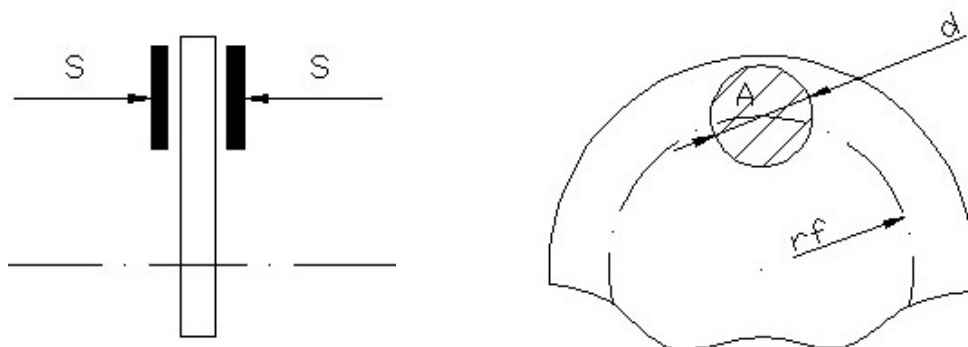


Fig. 1. Geometry of elements for brake system

## 2. THE STUDY OF COMPRESSIVE STRESS AND DEFORMATION FOR THE ELEMENTS OF FRICTION COUPLE WITH HELP OF THE METHOD WITH FINITE ELEMENT

The method of the finite elements represent an instruments of which thing through digital adding structural methods permits the determination of the compressive and the deformations of technical structures below the act of exterior forces. [3]

The stages realization of the analysis am:

- the realization of three-dimensional drawing (in the case in which is done three-dimensional analysis) of technical submissive structures of the analysis;
- the preparation of the model for analysis,
  - a delimitation a surfaces on which is applied the adequate pressures
  - material property of the elements;
- for the solution of the problem he did the automatic definiteness of the knots and the elements finite ale of the net of the structure;
- the reports generation.

Analyze he achieved with help of the program Cosmosxpress from Solidworks 2004.

After the material definiteness and the indication of the compulsions, he entered the value of the axial thrust the plates on disks.

For the realization of necessary braking moment [9] the axial thrust of a plates on disks is of 3840 N.

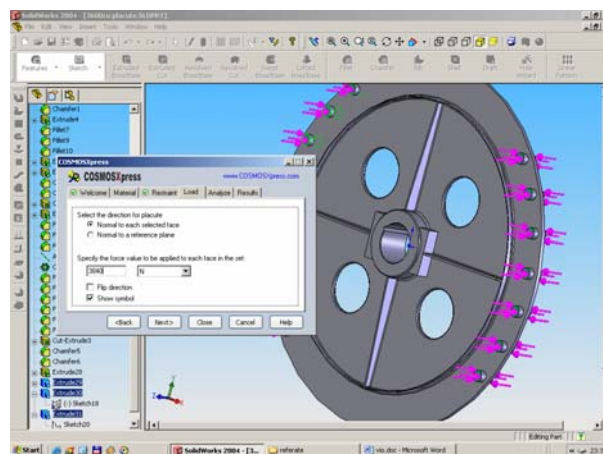


Fig.2 Simulation of axial thrust of plates on disks

After „RUN” command it's need to input the value of factor of safety (figure 3)

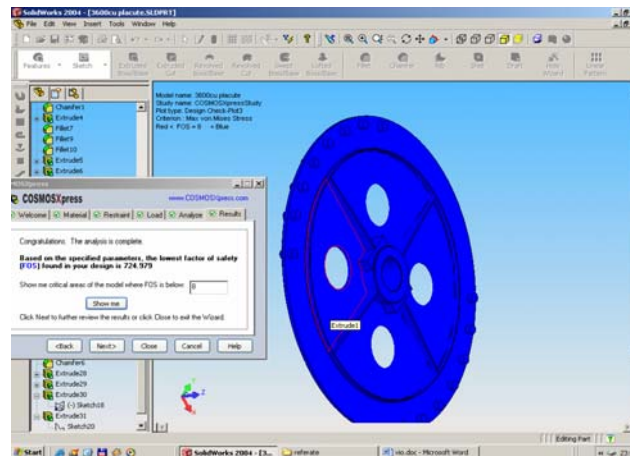


Fig. 3. Input the value of factor of safety

As per the technical norms of project fittings of mining extraction the factor of safety has the value 8. [8]

After the run of the program is generated reports about the compressive stress of the system( figure 4) and this deformations ( figure 5)

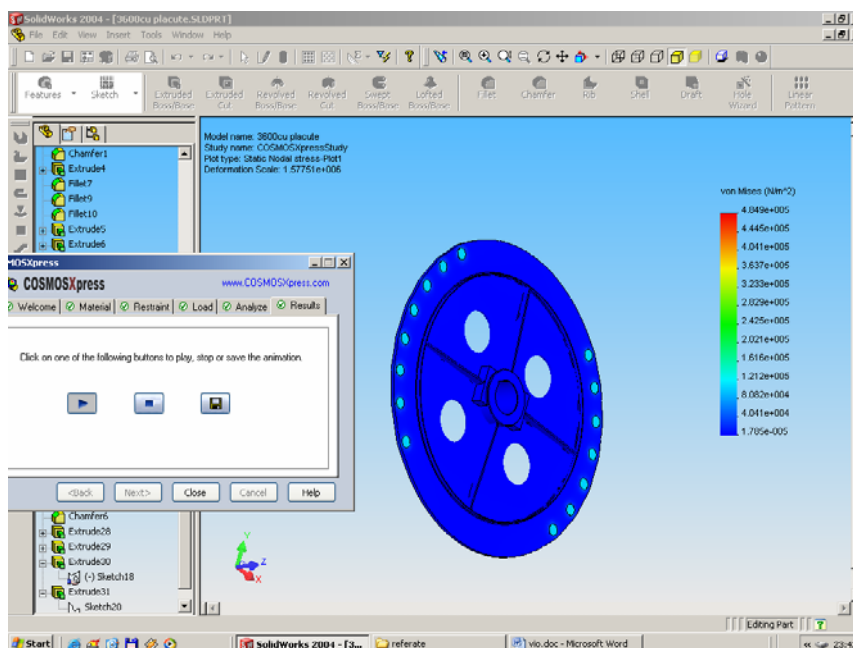


Fig. 4 Compressive stress in brake disk

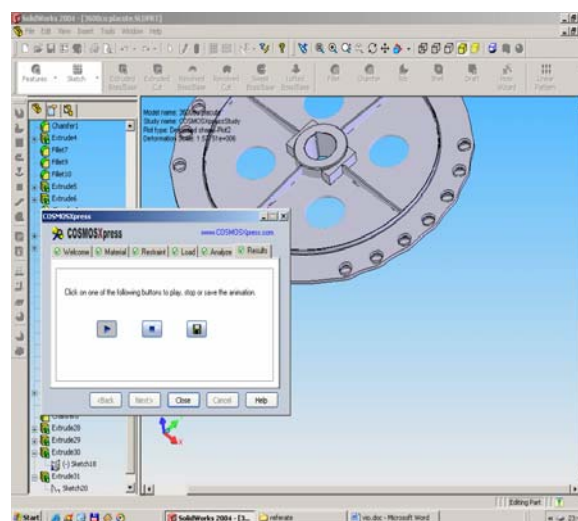


Fig.5 Deformation of brake disk in function regime

### 3. CONCLUSIONS

After the analysis with help of the method with finite elements output the fact that the elements of friction couple from the brake system are proper.

This method of analysis presents the advantage that permits a quick verification of the system of braking for different forces of press the plates on disks.

The brake system with disks present a series of advantages [1][5] among which most important by-paths:

- design compact in reduced space;
- principles of simple operation;
- breeds the reliability of the system through the elimination of intermediate elements( handspikes, draw-bars, bolts, etc);
- he breeds the safeseat degree of braking;
- the automating balancing of the forces of braking;
- little inertia;
- reduced basic time;

### References

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