TECHNICAL UNIVERSITY OF LIBEREC
FACULTY OF MECHANICAL ENGINEERING
Department of Design of Machine Elements and Mechanism
LABORATORY OF APPLIED MECHANICS

E X P E R I M E N T A L M E T H O D S

TEST REPORT

Name: **Measurement of plate's deflection**

Date: **30.2.2013**

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Content:

Measurement goal:

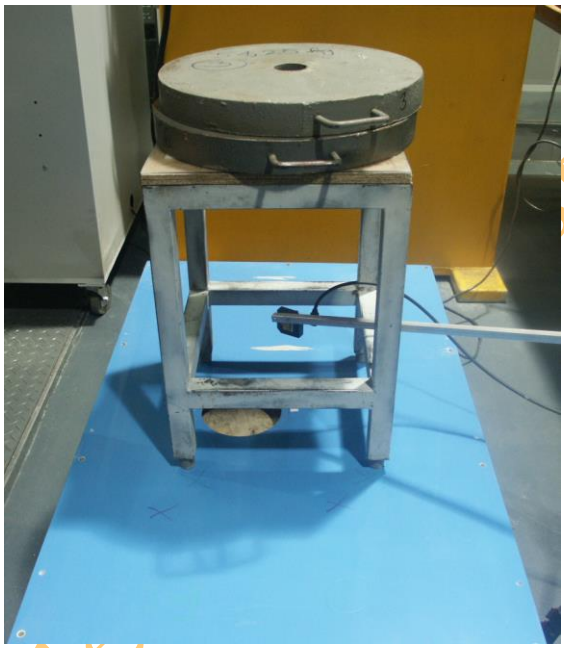
Measure the plate's deflection in three defined areas under static load. At the same time determine whether there will be destruction of the plate at approximately 200 kg load.

Used equipment:

- 4 pieces of weight (52,45kg 51,25kg 51,95kg 52,15kg)
- laser sensor of position BOD 26k DM707199
- logger Dewetron 5000, Dewesoft 7.3. for recording the measured data

Experiment procedure:

The whole arrangement of the experiment is on the following picture:

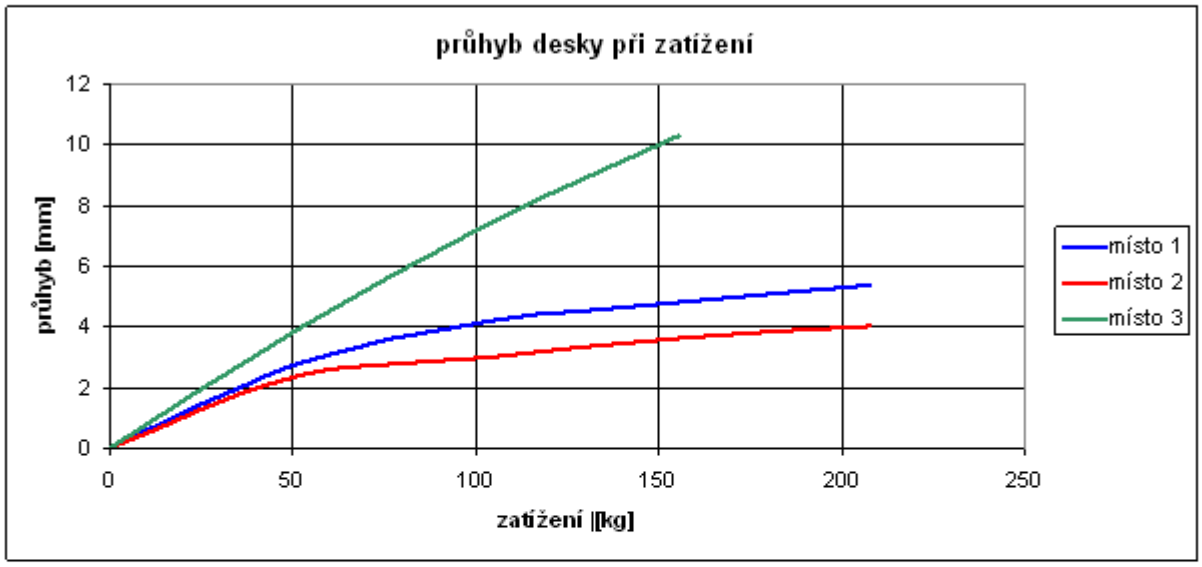


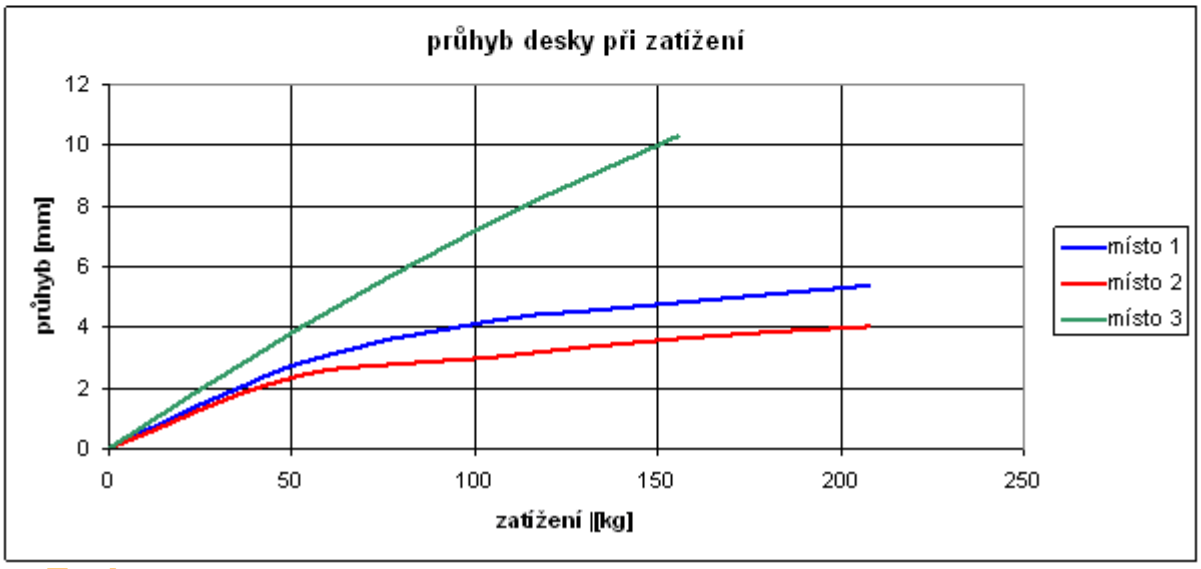
The plate was attached to the underlying profiles. The chair was gradually placed on three defined positions for applying the load. Weights were gradually added on the chair in the following order 52.45kg, 51.25kg, 51.95kg, 52.15kg. Applied load was thus gradually 52.45kg, 103.7kg, 155.65kg and 207.8kg. The value of the maximum load was determined by the requirement to find out destruction at approximately 200 kg load. Loading chair was placed into the marked points during the first and the second measurement. Sensor of deflection was always attached in the middle of the chair. One outside support was dismantled for the third measurement and the chair was placed on the edge of the bath. Measuring point was on the edge of the bath. Measurement was carried out under ordinary laboratory conditions at ambient temperature of 20 ± 1 °C.

Experiment result:

Plate's deflections for individual measurements are on the following table and graphs:

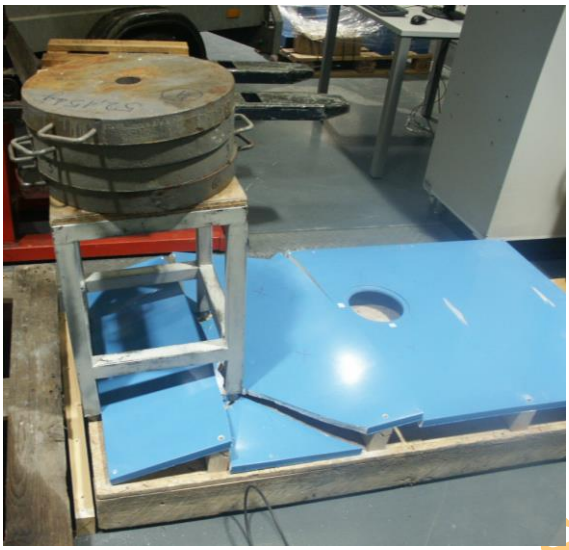
průhyb desky při zatížení							
zatížení	0,0	51,5	103,7	155,7	207,8	[kg]	hodnocení
měřicí místo 1	0,0	2,8	4,2	4,8	5,4	[mm]	bez lomu
měřicí místo 2	0,0	2,4	3,0	3,6	4,0	[mm]	bez lomu
měřicí místo 3	0,0	3,9	7,4	10,3		[mm]	**destrukce**





The plate withstood the maximum load at the first and second location without any visible damage. There were no signs of structural damage of the plate during loading (crackling etc). The deflection was none after relief. No residual deformation remained. The maximum value of deflection was 5,4mm at point 1 and 4mm at point 2. There was already from the beginning of applying the load great plate's deflection at point 3. The plate withstood without any damage the load of three weights that is approximately 150kg. The deflection was already

10,3mm on the edge of the plate during mentioned load. Placing the forth weight let to its immediate total destruction. Destruction can be seen on the following picture.



Conclusion:
The plate withstood the full load without any signs of damage at point 1 and 2. The maximum values of deflection were similar - 5,4mm at point 1 and 4mm at point 2. There was already from the beginning of applying a load great plate's deflection at point 3. The plate withstood without any damage the load of three weights that is approximately 150kg, the deflection was 20,3mm on the edge of the bath. Placing the forth weight let to its immediate total destruction.