

COMPARISON OF MECHANICAL PROPERTIES OF INNOVATIVE FURNITURE JOINTS

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INTRODUCTION

This research has dealt with the comparison of selected construction joints. The research also included new connecting elements that appeared on the market few years ago, their main construction part is made of plastic and their main goal is a simple production and assembly.

MATERIAL & METHODS

As a part of the research the most often used types of furniture joints were selected. Joints were subsequently divided into groups of CAM joints and experimental joints. Distribution was done on the basis of observing the behaviour of carpenters and companies producing furniture. As a part of the research selected types of joints were tested in two groups. Each group was represented by several types of fittings. It is always a visual type of furniture connection, dowels were added to some connection types. The excentre group included samples of excentre joint with a plastic or zinc excenter (Fig. 1) and screw excenter. The group of experimental joints included Onefix plastic excentre samples, SC 8/60 plastic joints and Cabineo joints (Fig. 2). A dowel joint was used as a reference sample. From each type of joint L samples, used for mechanical testing, were made from three-layer chipboard with the thickness of 18 mm and size being 150 x 150 x 356 mm. The tests were carried out on a universal tearing machine with the feed rate of 8 mm/min.

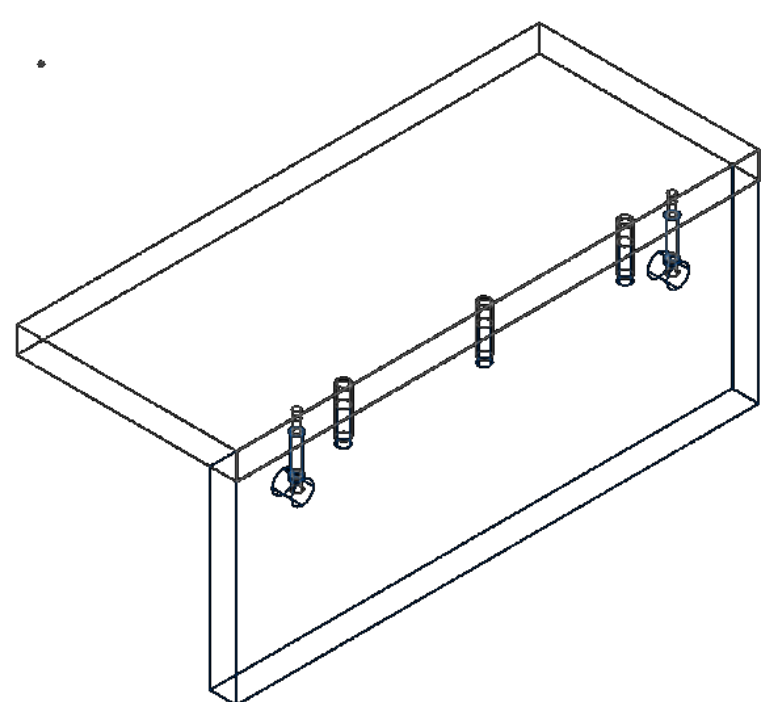


Fig. 1 - 3D model of CAM joint sample

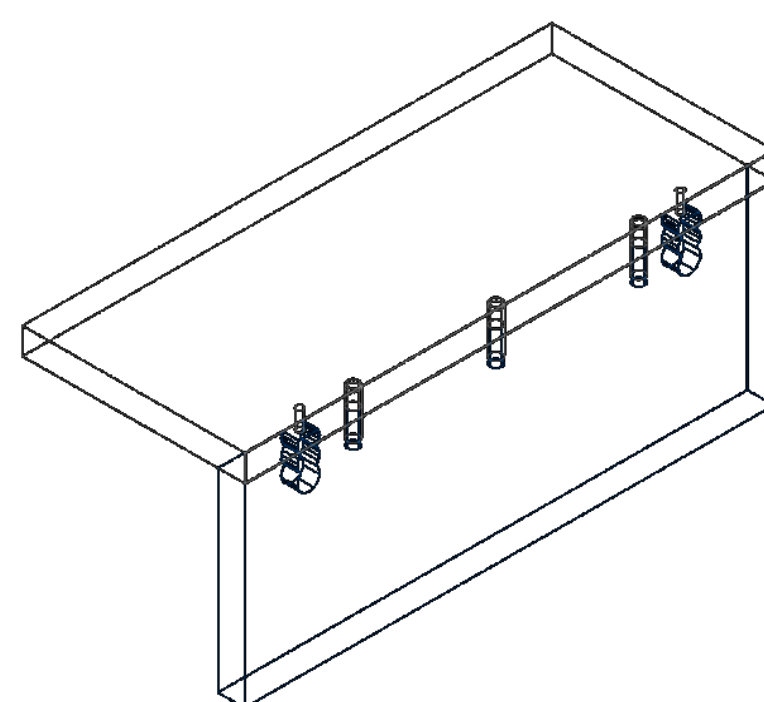


Fig. 2 - 3D model of Cabineo with dowels

RESULTS AND DISCUSSION

As a part of mechanical testing of bending moment values – compress stress, the samples from the CAM group reached an average value of 30 N.m.

As a part of testing of bending moment values – compress stress, the samples from experimental joints group reached an average value of 15 N.m. and reference dowel joint reached 14 N.m. As a part of testing of bending moment values – tensile stress, samples from the CAM group reached an average value of 33 N.m. As a part of testing of bending moment values – tensile stress, samples from the experimental group reached an average value of 24 N.m. and reference dowel joint reached 17 N.m. After cleaning the results data by removing the strength of the dowel joint (Tab. 1), it is clear that the CAM joint group achieved better average results than the experimental group. This result is influenced by the fact that the group of experimental joints includes plastic joints which reach the lowest values both in compression and tension.

Group	Sample marking	Bending moment values (compress)	Bending moment values (tension)
CAM joint	Plastic CAM + dowels	19 N.m	18 N.m
	Zinc CAM + dowels	18 N.m	17 N.m
	Tofix + dowels	9 N.m	12 N.m
Experimental joints	Onefix + dowels	5 N.m	6 N.m
	Ixconnect SC 8/60	6 N.m	7 N.m
	Cabineo	11 N.m	24 N.m
	Cabineo + dowels	11 N.m	24 N.m

Tab. 1 - Comparison of individual joints after deduction of dowel joint strength

CONCLUSION

The individual types of joints can differ considerably from each other, be it construction, type of assembly, price, mechanical properties, etc. The most fundamental difference in the test results was the fact whether the sample contained an additional dowel joint or not. For some degree of comparison the dowel strength values were deducted from the joints containing the dowels. Mechanical testing showed that the samples from the CAM joint group achieved higher values than the samples from the experimental joint group.