CYCLIC LOADING ON STRUCTURAL ASSEMBLAGE OF RC HIGH-RISE BUILDING WITH CORE AND PENDULUM COLUMNS

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Connections of prefabricated pendulum columns and beams constituting the exterior part of the RC high-rise residential building, the core of which serves as the horizontal forces resistance element are analyzed on ten models.

Although the columns are loaded according to calculations only by axial loads,in earthquake due to horizontal movements of the building,there is a danger of damage of these columns, i.e.their joins with beams on the floor level.

Models worked out of reinforced concrete in scale 1:2.5 are selected out of a 20-story building which is to be constructed in a high-intensity seismic zone. The axial loading is constant and varied between $(0,12\text{-}0,78).P_u$. The lateral force is slowly alternating at the end of the column, introducing large horizontal deflections. The connection between the beam and the column was achieved by a steel pin and by a contact area formed by epoxy mortar layer.

The ability of energy absorption of the joint was found out by testing, although theoretically it should be a free-rotating joint. Hysteresisloops for the models with low axial force are very stable.In high axial forces stiffness deterioration is significant and the energy absoption is well expressed. Since the number of such joints in the building is large, the joints have a beneficial impact upon the damping of the seismic energy.

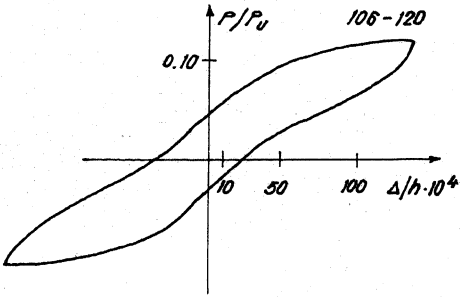

Fig.1 Hysteresis loops for models 8,9

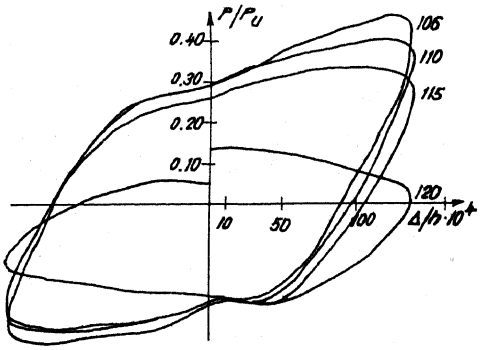

Fig.2 Hysteresis loops for models 6,7

Model No	Main reinf. %	Stirrups v %	P/P_u	M_u (tm)	H_u/A_c (kg/cm²)	Angle $\Delta/h(.10^{-4})$
1	1,17	0,39	0,78	1,34	9,8	70,4
2	1,17	0,39	0,78	1,01	7,4	63,5
3	1,17	0,39	0,78	0,73	5,4	14,1
4	1,17	0,39	0,78	1,49	10,8	84,6
5	1,17	0,39	0,12	1,51	11,1	137,0
6	1,67	0,25	0,45	1,41	8,0	137,0
7	1,67	0,25	0,45	1,32	7,5	137,0
8	1,67	0,25	0,12	0,99	5,6	137,0
9	1,67	0,25	0,12	1,03	5,9	137,0
10	1,67	0,25	0,61	2,00	11,4	61,6

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