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THE EFFECTIVENESS OF SEISMIC INSULATION OF THE FOUNDATION IN MULTI-STOREY REINFORCED CONCRETE BUILDINGS

Mavlonov Ravshanbek Abdujabborovich
Senior Lecturer

Numanova Sohiba Ergashboevna
Teacher, Department of Manufacture of Construction Materials, Goods and Structures, Namangan Engineering Construction Institute

ANNOTATION

The dynamic reaction of a building during an earthquake is one of the most important reasons for building damage and deterioration. The main idea of seismic insulation is to protect these buildings and structures from deterioration in the impact of earthquakes, as well as to separate the building from ground shaking by applying an elastic base. As a result of the installation of the insulator in the middle of the foundation and the construction, seismic insulation is carried out. In this study, the resistance of the reinforced concrete building to seismic loads, the basis of which is seismic insulated, that is, the characteristics of the building in which the lead rubber base is used, the operation in the earthquake process of the usual building were compared and theoretically studied. The article focuses on the effectiveness of the foundation seismic insulation system, as well as on the determination of the ground cross-force, the cross-direction and floor displacement of the building. Using El-Centro earthquake records, the operation of the 10-storey iron concrete carcass building in the earthquake process was carried out using the real-time analysis method SAP2000 program.

KEYWORDS: *Foundation insulation, Real-time analysis, El-Centro earthquake, lead-rubber base, SAP2000.*

I. INTRODUCTION

A large part of the world's population lives in seismic safe areas. Every year, as a result of earthquakes, many people have dried up their pillows and damage their property. Seismic waves are initially observed at the foundation surface of the building. When the wave is transmitted to the building, deformation is observed in the constructions. In most cases after the earthquake, the building becomes unusable. Recently, many researchers and engineers have been trying to design and build buildings in a seismic safe location by reducing or completely stopping the seismic vibrations transmitted to the building.

One of the common methods in the design of the structure resistant to seismic loads is the seismic insulation of the foundation. It is one of the most effective devices that passively control the vibration of structures. The foundation is fixed on a base consisting of layers of insulated construction, which divides the structure and its foundation into two parts. The insulating of the foundation can be izoxified as a construction standing on a frictional sphere. When the earth shakes, the ballad moves in time, but at the top of the structure, the displacement will have a small value. Therefore, when there is a shake, the vibration in the construction is transmitted less often. Insulators are usually designed to absorb energy, through which the building performs the

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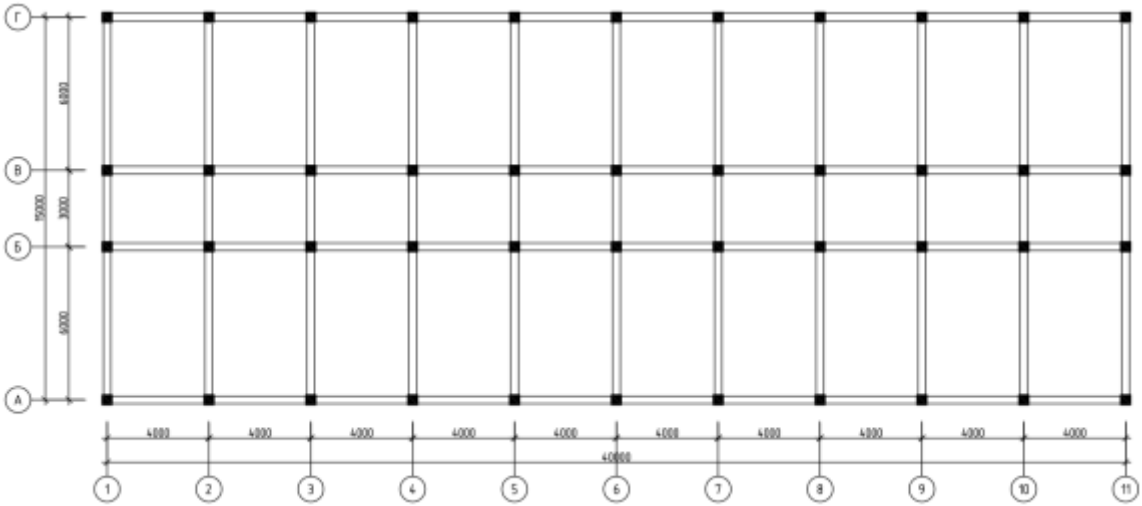
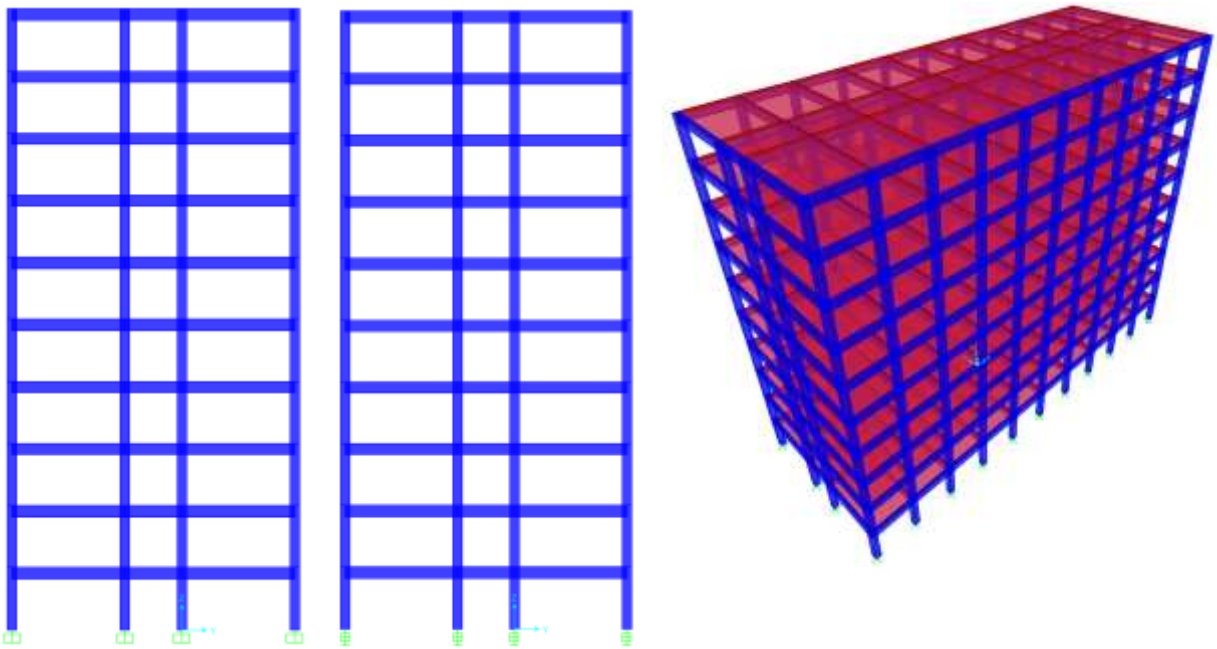
function of a extinguisher. This increases the resistance of the structure to seismic forces in the process of earthquakes.

II. Teaching method.

In this article, we will consider the resistance of the 10-storey building with reinforced concrete construction, the foundation of which is seysmically insulated and the foundation is stuccoed. The same loading scheme, the amount of load and the material properties apply to both types, that is, the foundation is insulated and the stucco is fastened to the building. Dynamic characteristics of the building on which the foundation is insulated are studied through the use of a lead-rubber base. The calculation was carried out in the SAP2000 v20 program, as well as the famous El-Centro earthquake records, which occurred in 1940 on the method of real-time analysis.



1-picture. Constructive scheme of the building



a) foundation bikir tightly secured building forty,

b) foundation seismic insulated building forty

c) spatial view of the constructive elements of the building

2-picture. Fortification and spatial view of the building

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The building is made up of monolithic reinforced concrete structures, and the orayopma and tomyopma plates are also monolithic. V25 grade heavy concrete and A-Sh grade fittings were used for the elements. Thickness of Orayopma and tomyopma plates h=20 sm, cross-sectional dimensions of the column on all floors bxh=50x50 CM, rigel cross-sectional size bxh=30x60 CM. It was considered that on the 1m^2 surface of the orayopma there is a constant load 1 kH/m^2, a temporary load 3 kH/m^2, on the 1m^2 surface of the orayopma there are permanent and temporary loads from 1 kH/m^2. The dimensions of the building in the plan and the range of arrows are shown in Figure 1. The number of floors is 10 pieces and the floor height is 3.3 m.

1-Table
Properties of the selected insulator (lead-rubber base) for the account

Indication	Insulator parameter	Name
V (кН)	3527	Максимал вертикал куч
K_{eff} (кН/м)	1710	Ҳисобий горизонтал бикирлик
K_v (кН/м)	1978000	Вертикал бикирлик
F_Y (кН)	121	Оқувчанлик чегарасидаги куч
K_D/K_i	0,1	Бикирликлар нисбати
K_D (кН/м)	1501	Оқувчанлик чегарасидан олдинги бикирлик
K_i (кН/м)	15010	Ноэластик бикирлик

III. RESULTS AND DISCUSSION

The Results of the horizontal X-and Y-direction shifts were taken from the calculation and were presented in tables 2 and 3.

2-Table. Full migration in the direction of the X-axis

Floor	Moving, Mm	
	Tightened	Seismic Insulated
10	19.81	15.06
9	19.09	14.92
8	17.96	14.71
7	16.45	14.43
6	14.59	14.09
5	12.43	13.69
4	10.03	13.23
3	7.45	12.71
2	4.76	12.14
1	2.07	10.45
Base	0	9.57

3-Table. Full displacement in the direction of the Y axis

Floor	Moving, Mm	
	Tightened	Seismic Insulated
10	19.37	14.77
9	18.83	14.68
8	17.87	14.53
7	16.51	14.33
6	14.77	14.06
5	12.70	13.73
4	10.35	13.34
3	7.78	12.90
2	5.05	12.40
1	2.26	11.81
Base	0	10.14

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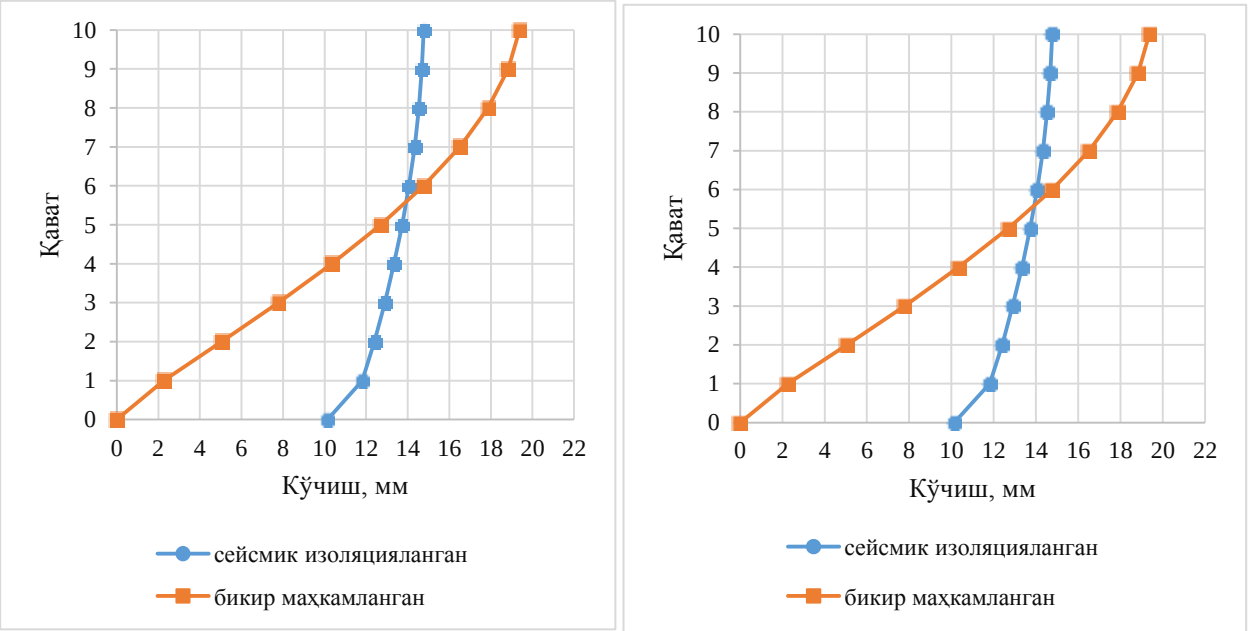

1-graph. Displacement of the structure by the X-axis, 2-graph. Displacement of the structure by the Y-axis,

1 and 2-as can be seen from the graph, in a sturgeon-tight construction, the displacement is zero at the foundation surface and sharply increases to the top floor. And in the case of a foundation-insulated construction, due to the fact that the insulator is used, it increases the elasticity of the construction on the foundation surface, the displacement on the foundation surface starts from 10 mm, and the migrations grow slowly until the highest surface.

4-жадвал. Full migration in the direction of the X-axis

Floor	Moving, mm	
	tightened	seismic insulated
10	0.22	0.04
9	0.34	0.06
8	0.46	0.08
7	0.56	0.10
6	0.65	0.12
5	0.73	0.14
4	0.78	0.16
3	0.82	0.17
2	0.82	0.51
1	0.63	0.27
Base	0	0

5-жадвал. Full migration in the direction of the Y axis

Floor	Moving, mm	
	tightened	seismic insulated
10	0.16	0.03
9	0.29	0.05
8	0.41	0.06
7	0.53	0.08
6	0.63	0.10
5	0.71	0.12
4	0.78	0.13
3	0.83	0.15
2	0.85	0.18
1	0.68	0.51
Base	0	0

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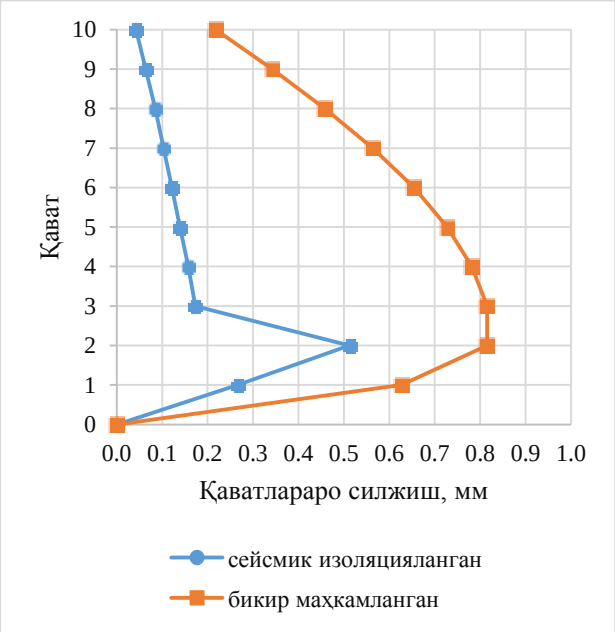
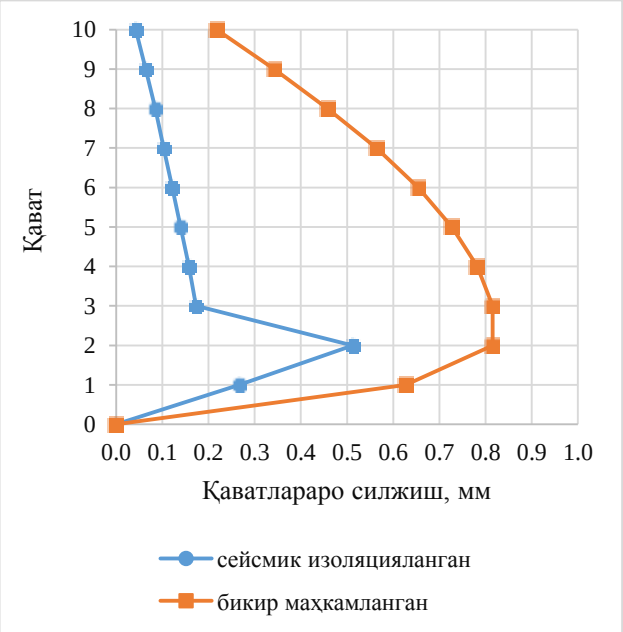


3-graph. Stir the floors of the building on the X axis



4-graph. Stir the floors of the building on the Y axis

3 and 4-the graph shows that the floor stir will be of great value in the first 3 floors, and in the remaining floors the value will gradually decrease. It can be seen that in a seismic insulated building, the amount of silcification is also significantly reduced compared to a stucco-clad building.

IV. CONCLUSION

The following conclusions can be drawn from this article on the application of the foundation insulation system in constructions:

24% decrease in the top floor landslides when using the method of real-time analysis for a El-Centro earthquake, the resistance of a 10-storey reinforced concrete carcass building to seismic forces is studied;

the floor foundation in the insulated building is reduced by 82 % compared to the usual building stir;

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