Indian J.Sci.Res. 5 (1): 407-417, 2014
ISSN: 0976-2876 (Print)
ISSN: 2250-0138(Online)

DESIGNING THE POSSIBILITY OF ELIMINATING SHEAR REINFORCEMENTS IN THE PORTAL'S FUNCTION IN BUILDINGS WITH THE TECHNOLOGY OF FLAT DURABLE INSULATED MOLDS

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ABSTRACT

In this study, to allow comparison with the work done by previous researchers, we are up to, possibly, number, and size, selected specimens should be coordinated with the work already done. As in previous studies, most of the samples, with a minimum longitudinal reinforcement, in accordance with paragraph 3.4 Regulations ACI 318-99, had been armed for the wall, and the amount of reinforcement was less than, the minimum steel curved beams. Samples before they reach the decline in strength, being broken in bending. This research is aimed to increasing bending steel, the sample (observation, the minimum bending steel in the beams) so that, before flowing tensile steel, the decline occurring shear in the column. This study will examine the expression of views, and different tests, the horseshoe ports, building constant insulation, during tests in 2000, had been declining strength, the program Abaqus, 8 samples, horseshoe port and with the mouth and various aspects of using technology, insulated lasting impression flat, without Khamoot model is then used to evaluate the performance of these instruments samples to be of great help to improve the facilities, the construction of Mehr housing.

KEYWORDS: Khamoot, Portal's Function, ICF, Abaqus

PROBLEM STATEMENT

In developed countries, which for years, issues, material durability, speed implementation, reduce material waste, reduce energy waste, and resistance of buildings against natural disasters, being constant attention and research, which has led to, innovation, and modern techniques in the field of construction Industry (ACI-ASCE Committee, 1962). The latest technique is to use a combination of reinforced concrete, as a member of the porters, and the panel polystyrene (EPS), a form of concrete, thermal insulation, which have been popular with System Concrete (ICF). Basis of this systems are used, bearing reinforced concrete structures, the roofs and walls of buildings, and partitions made of polystyrene, the armed light is directional, non-load bearing blade. The walls are concrete, in the form of panels, reinforced polystyrene, and mold on the ceiling, too, are made of polystyrene reinforced, or caved, similar to concrete ceilings Aspayrol.

In other words, the building is wrapped in two layers of poly styrene, which in terms of insulation is to have maximum efficiency. General wall and ceiling components, and partition reinforced polystyrene, are prepared in the factory, and the installation is carried Location (ACI 318-99, 1999).

Constant insulation mold technology is one of the technologies approved Research Center building, and Housing Iran, due to its many benefits, has been notable for many classes of our people. In this system, the structural calculations on architectural design, horizontal reinforcement in one or two table (depending on structure) of an open end wall, are being sent into. After this step, the vertical reinforcement, depending on structural requirements, are sent up into the wall. A very high strength, whether under gravity loads, whether under earthquake loads, saving energy is very high, possibly running in different climatic conditions, and the life of the building is much higher than other buildings is one of the benefits of technology, insulation forms constant . (ACI-ASCE Committee 426, 1977) Framing, Reinforcement bending and shear, and finally, concrete horseshoe port, is one of the activities, the relative difficulty of the buildings. This study is an attempt to; investigate performance when the horseshoe portals concrete buildings under gravity loads without Shear Reinforcement implementation (putting Khamoot).

System check

Building technologies, sustainable forms (ICFS): templates, which are, forever, fresh concrete in the fall, and to always stay on the job. Basically, it is a lasting advantage in terms of staying in business due to fighting

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environmental conditions, such as corrosion protection and concrete, and their insulating properties.

In most cases, the constituent materials, form lasting insulation can be four. Includes templates, polyurethane, molding material, and expanded polystyrene, molded (EPS), expanded polystyrene, is Aksrod (XPS) and they form templates consist of, EPS and cement composition (composite).

EPS, is usually the least expensive, and is well insulated against the weather. XPS, compared to EPS, is more expensive, and 25 percent, are above the insulation, and somewhat more resistant against water. EPS and XPS, are both made from the same plastic (polystyrene), and yet, the process of making different combinations of formats, from cement and EPS (composite), due to the cement, are more resistant to a measure for cutting, shaping, require more effort, and being insulated, is slightly less (Fatemi, 2009). Of these templates is mostly made of expanded polystyrene, slow burning. Templates, forms of domestic and cross-section, generally divided into two categories, flat and templates with variable cross-section, which is included as a pancake network system (a two-dimensional grid without holes), netting systems and networks, (a two-dimensional porous network).

The problem with the section system variable is not likely to fill all horizontal channels Templates by concrete, and the lack of integration in the wall structure. The type (ICFS), in the event of fire, and burning polystyrene, is not an obstacle, to prevent the passage of flame, and it will be expanded (Department of Housing, Building and Housing, and Urban Planning and Research Center, Research and Documentation, 2008).

Seismic Behavior and structural systems

The main load bearing elements of the building are made, the system (ICFS), load bearing walls (shear walls) and roof joists blocks or slabs beds are relatively thin (compared with buildings, concrete, reinforced conventional). In these buildings, the walls of the structure, as key elements resisting lateral loads, as well as members, (in combination with the roof slab), to Tolerance, and transfer vertical loads (due to the lack of beams and columns) is very important (Brzev, et al; 2004). Modeling panel walls was based on the method, finite element, and can be done by, iso-parametric elements membrane (Committee terms of lasting insulation, 2010). Integration builds walls and concrete roof in place, presents, good seismic performance, for the system (ICFS), and can make, horizontal integration, vertical and other structural components. The continuity and smoothness causes the delayed formation of plastic zones in critical organs and structures such as joints, walls, ceiling, or around openings, and building systems, the incidence of the seismic performance good, so that, even reactionary behavior is expected during relatively strong ground motion, the system (ICFS) integration, the distribution of mass and stiffness is fairly uniform, it is not far-fetched to expect. Theoretical reliability, as well as observations of past earthquakes, is the fact that, whatever the number, structural members participating in the freight, (unspecified) be more, and their performance should be independent (eg, parallel systems, not systems series), Seismic Behavior structure would be more suitable and more desirable (etal; 1999 Whittaker,).

RESEARCH OBJECTIVES

1 - is the removal of shear reinforcement, horseshoe port, the building design stage, with technology, molds constant insulation, due to the increasing performance of buildings, with the technology in the world, engineers and practitioners, the country's construction, will be possible to use the results of this study.

2 - Effect of lack of shear reinforcement.

3 - Cheaper running costs, and reduce time of construction of buildings.

4 - A research need is to decline reaching shear, bending before fracturing.

5 - The application is easy to perform, and economical buildings housing seal.

Defined Concepts

Horseshoe port: to the bar, over windows and doors, roof load, shall be transferred to the column, is called the horseshoe port. Two ends of the horseshoe port should be at the top of the column, or wall, placed so that the weight of the horseshoe port shifted entirely to columns or walls (ASTM C31-96, 1996).

Function and purpose, horseshoe port: Horseshoe port, usually located on the top, doors and windows, and is responsible for maintaining material, is laid on it. Horseshoe-port basis, it is possible to be made of brick, concrete or stone (ASTM C143-96, 1996).

Types, Horseshoe port, and method of implementation

Horseshoe port brick (brick arch)

This type of coverage, the last time ever, is common in residential houses and public buildings, and traditional. The horseshoe port can be used from a variety of flat arch, crescent, half circle, half circle, square, goat horns, and seven and five. First, due to the distance between the nozzle port mapping, and the desired arch shape, then build a mold made of plaster or wood, and put on the base of the arch, the arch brick, using quality bricks, mortar, gypsum, or plaster, are mounted on the mold, and after drying, the mold is removed. Usually maintain a beautiful arc inscription above the door and windows, and install the same arc. Sometimes, for a more elegant inscription it is made in the form of art, decorative, they say it nodulation, and the node, are filled with colored glass.

Horseshoe timber port

The horseshoe port, make of, wooden beams strengthened with circular section. Two wooden beams, sides, and on the abutments, which are so placed, the beams, the parties to the size of 30 cm, is placed on the abutments, to prevent, to roll round beams, the middle, and two the beams, which connect the pieces of wood and nails, to each other. The wooden beams, prior to use, the coated, anti-termite pesticides, infiltration of termites and other vermin, to prevent inside it (ASTM C39-96, 1996).

Types of flaps

1 - Small flaps

2 - Large flaps (ASTM C192-96, 1996).

In this study, due to the high importance, pop with a big flaps, big flaps horseshoe port, has been tested.

Type of material: materials used, the horseshoe ports, types of buildings, shall include concrete, steel, brick, stone, wood.

The fulcrum: to the surface of the wall or column at both ends of the horseshoe port, is placed on the abutments say. The port is wider, equally, horseshoe port, it will be wider, too, and can withstand much greater loads. The minimum height of the horseshoe ports is equal to 15 cm. How to distribute the load on port horseshoe brick is in the form of a triangle, and a 60-degree angle (ASTM C78-94, 1984).

The main types of shear transfer:

1 - Shear stress in concrete without cracking: This event is caused by the non-cracked, members of the building. Interaction, tension, shear, tensile stress and compressive stress is generated by the main entrance, which is due to be left diagonal, or brittle failure (etal; 1999 Whittaker,).

2 - Friction Shear: Displacement is the mechanism, the cutting, which is transmitted across a given surface, or the surface, where it may be, is a slip occurs (Prepared for the US Department of Housing, 1998).

3 - Hub behavior: if the left transverse reinforcement bars, there is a force in the steel hub, due to the displacement of times, left the road, will resist cracking. Hub force arises from the adjacent concrete, and surrounding, the combined load bars, which are associated with filling gaps cracks along the reinforcement. The effects hub grows the diagonal crack. This acceptance, filling the gap left goes into the opening, which is associated with the production, friction, shear, and failure loads (Kani, 1966).

4 - Arc behavior: in the deep dark part of the load is transferred to support, by moving the arc. The arc, allowing the transition to a vertical concentrated force for the reaction in the deep part. Beams, provided, inhibiting the action of longitudinal bars is the typical (NAHB Research Center, 1998).

5 - Shear reinforcement: directly increases the shear capacity, but provides protection from, transfer, several types of cutting. Shear reinforcement, the width of diagonal cracks, the beam is narrow, and is thus larger, or in essence is maintaining shear friction behavior, hub, and the behavior of the arc (ACI-ASCE Task Committee 426, 1973).

Shear reinforcement, usually looked at, and reinforced concrete beams, the yielding of the steel form, which occurs before shear failure (Nilson, etal; 1991). Cutting is transmitted from one place to another in a different way, in the reinforced members. State of motion, including failure mode depends on the method of shear transfer. Shear failure; markedly alter the exercise element (ACI-ASCE Task Committee 426, 1973).

RESEARCH METHODOLOGY

In this study will examine the expression of views, and different tests, the horseshoe ports, building insulation, persistent experimentation during 2000, reaching, bending decline, the Abaqus program model is 8

samples , horseshoe ports, openings of different sizes, to improve the facilities, the construction of housing and seals, may be a great help. Abaqus, powerful engineering software, is based on the method, finite element, which has the ability to solve problems, examples, simple linear and nonlinear simulations developed. Abaqus is to include an extensive library of all the elements that will be necessary to draw geometric and also included is a powerful library, including many of the mechanical properties of materials, such as metals, rubber, polymers, composites, concrete types armed, various foams, geotechnical materials such as soils and rock types.... Abaqus is a software simulator, multi-functional. At first, you know, it can be used to model the samples, software Abaqus, and came to a reasonable solution. The answer is known, is such that, should one of the examples, is the main journal, the model with the same features and dimensions of the sample, to obtain the answer. If the answer obtained is close to, answering the original sample, placed in the case, the real test, can be used to model your own samples, Abaqus program.

Loads tested, 2 spot, is applied to the beam, which is to include:

1 - Weight Joist

2 - Weight on joist, and the initial load, which is applied before the experiment began.

Shear span is defined as the support, the distance from the first shearing force.

Disruptive manner, which follows from:

1 - Sectioned before tensile steel product

2 - Sectioned, After-product of bending, the tensile steel

3 - Deformation, excessive deflection, is induced, tensile steel surrendered.

In this study, firstly, section part, the model has three components: concrete, rebar set, (assuming, without loss of strength between the welding rod) and abutments (or rigid) and the module property, enter is the third component properties. The module assembly, parts assembly done, and the step, performed analyzes, and the settings, and the interaction, the interaction between components, and the load, boundary conditions, and loading, and the mesh made of mesh model. The job, is done, proceed to the analysis, and settings.

This analysis assumed to be quasi-static, and the friction between the fulcrum and floor beam zero. Applies to a wide load at 1.3 mid-beam, and abutments, are fully constrained model. In this case, half model of the beam, and the beam, is intended as, symmetry page. Beam elements, and supports, are of cubic and quadratic first order, and are structured.

To review, analyze the load applied to the low value and increases it when the maximum axial stress reached the limit of tolerance beam, is assumed as the starting point of leaving.

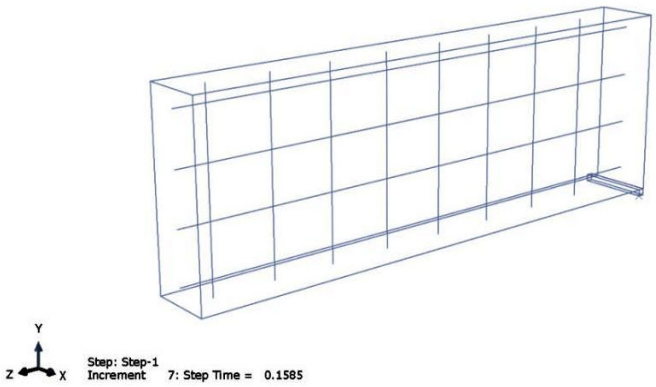
The introduction, sample journal

Sample are presented in Table 1, Dimensions and force, is given below:

Table 1: Sample tested on Journal

Test specimen	bw (in)	d (in)	L (in)	Tension reinforcement	Ultimate capacity (Ibs)	at ultimate (in)
FLAT1 _ 8*24	8	21.75	136	1 T 12	15494	3.2

This sample has been declining, with a maximum force of 15,494 pounds, (7.03 tones), which is to have a delta, equal to 3.2 inch (8.1 cm). At the same samples, with all your details, we Abaqus program. If it was close, it was the wake-up process.



The Sample 1, of Journal

Figure 1: Sample 1 of Journal

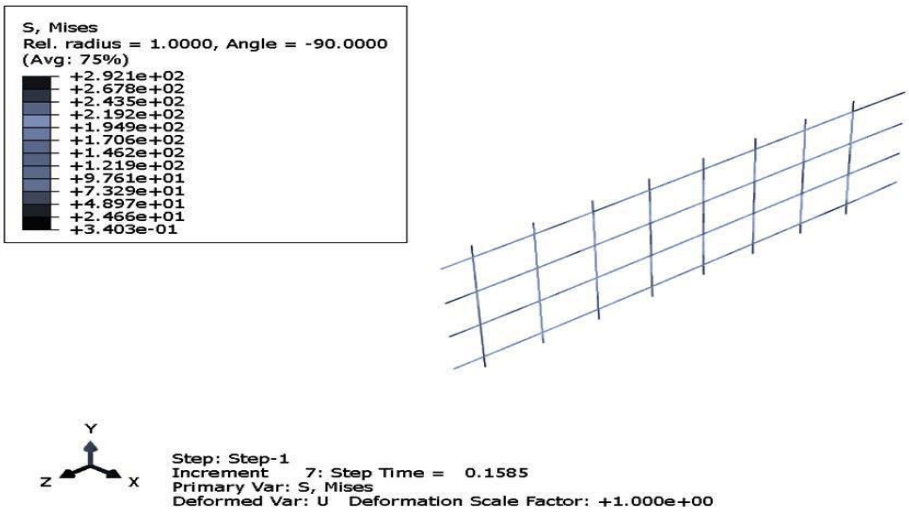


Figure 2: Reinforcement stress tensor

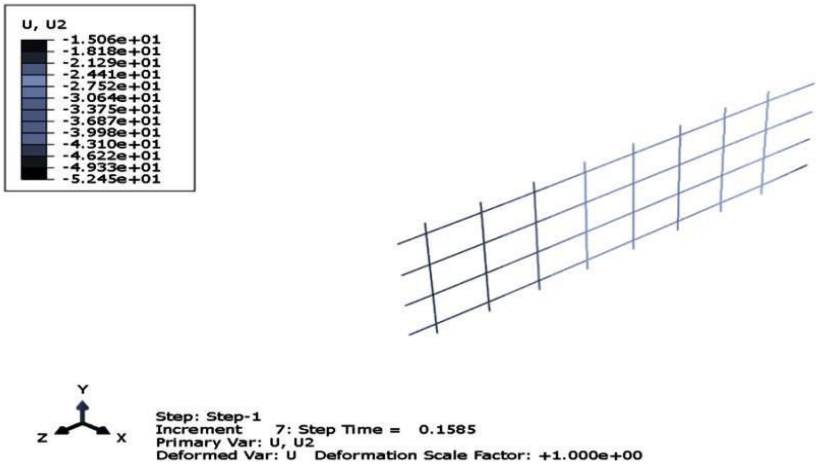


Figure 3: Armature displacement tensor

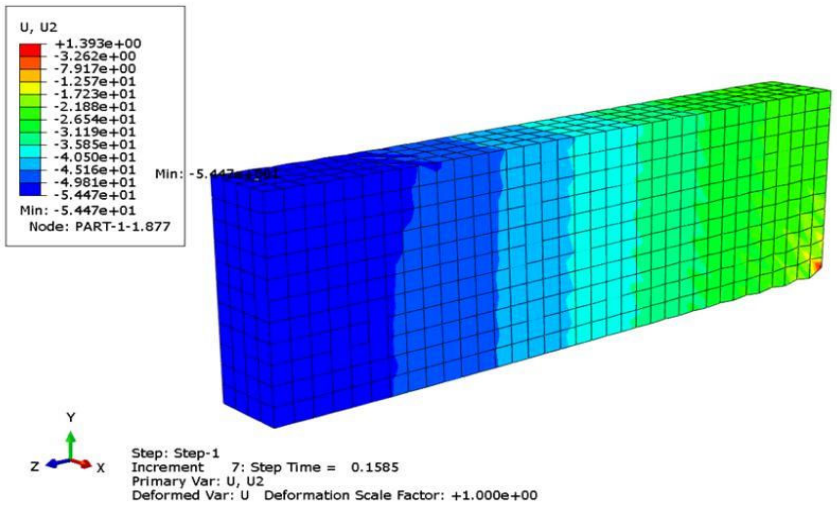


Figure 4: Shift tensor on concrete

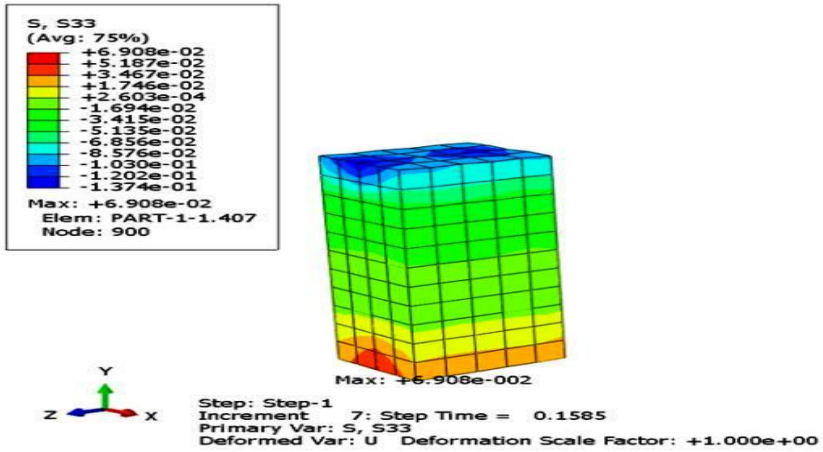


Figure 5: The maximum bending stress tensor

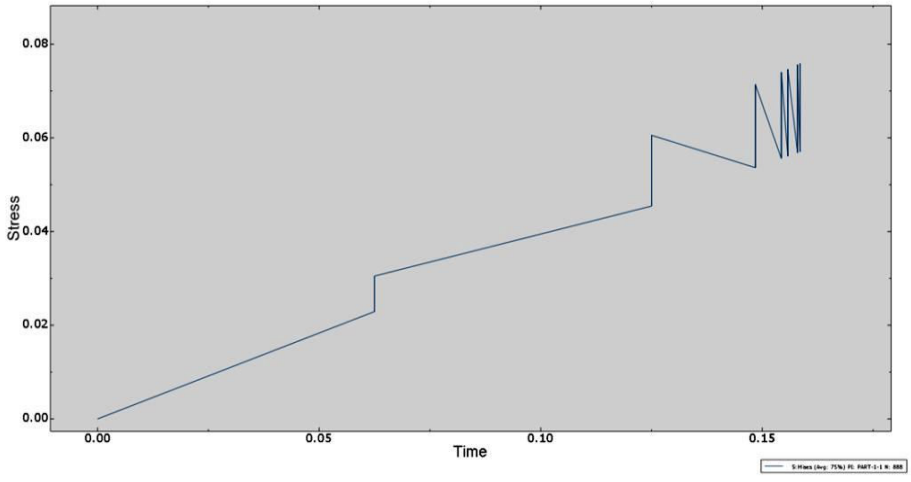


Diagram 1: Changes in tension, on maximum bending stress

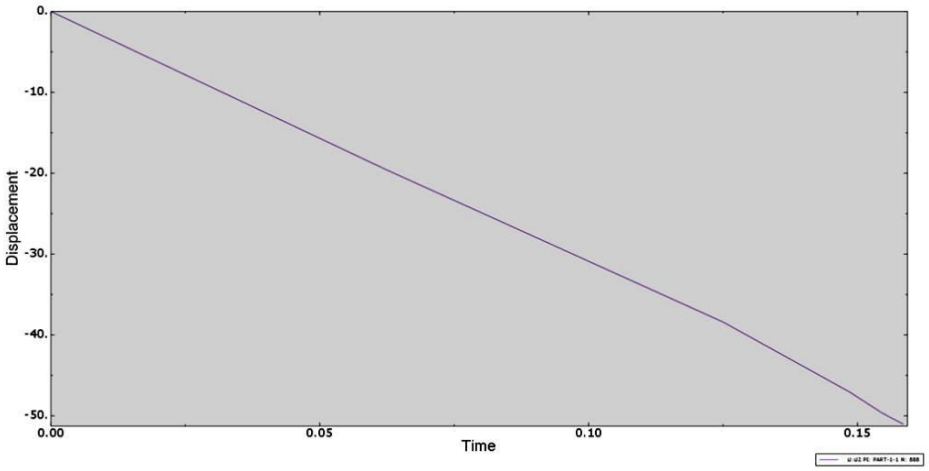


Diagram 2: Shift changes, on maximum bending stress

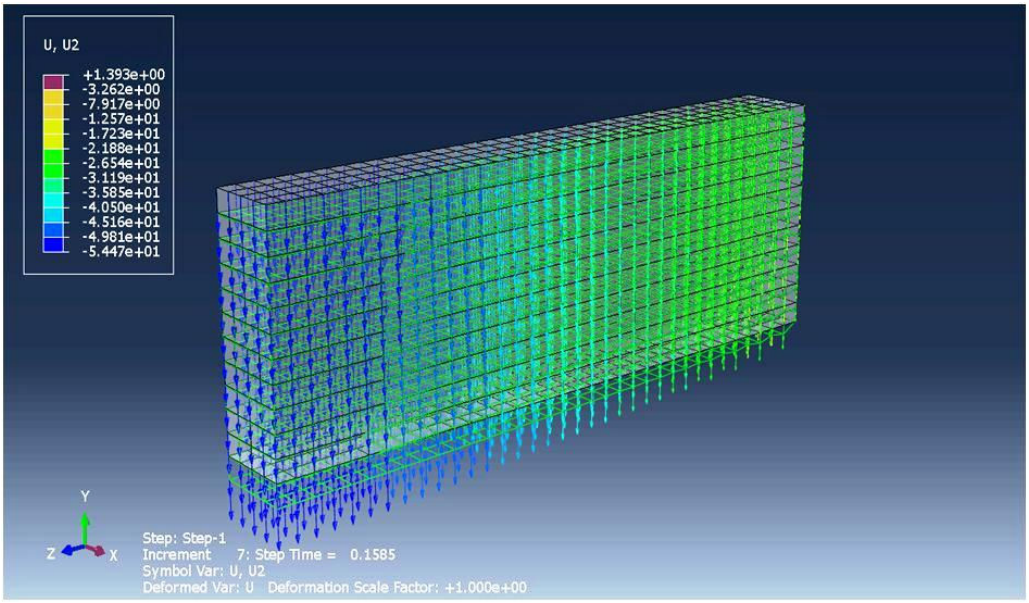


Figure 6: Conforming to the initial state of the beam, and after time, on half beam

Overall, the shoe is modeled 8-port form constant insulation, the use of technology, forms a permanent waterproofing flat, without Khamoot, then the case is investigated, the structural performance of the samples. Dimensions of samples are shown on Table 2:

Table 2: Characteristics of the sample dimensions

Test specimen	bw (in)	d (in)	L (in)	Tension reinforcement
FLAT1a _ 8*24	8	21.74	136	2 T 16
FLAT1a _ 4*12	4	10	133	1 T 12
FLAT1a _ 8*12	8	10	133	1 T 16
FLAT1a _ 4*24	4	22	137.7	1 T 16
FLAT1b _ 8*24	8	21.74	136	2 T 22
FLAT1b _ 4*12	4	10	133	1 T 16
FLAT1b _ 8*12	8	10	133	2 T 16
FLAT1b _ 4*24	4	22	137.7	2 T 16

The results obtained are as follows:

1 - Stress tensor, on reinforcement

2 - Tensor displacement, on reinforcement

3 - Tensor displacement in concrete

4 - The maximum bending stress

5 - Diagram of stress changes, on maximum bending stress

6 - Chart, shift changes, on maximum bending stress

7 - consistent, the initial state of the beam, and the applied load

Here, offered Sample output a1.

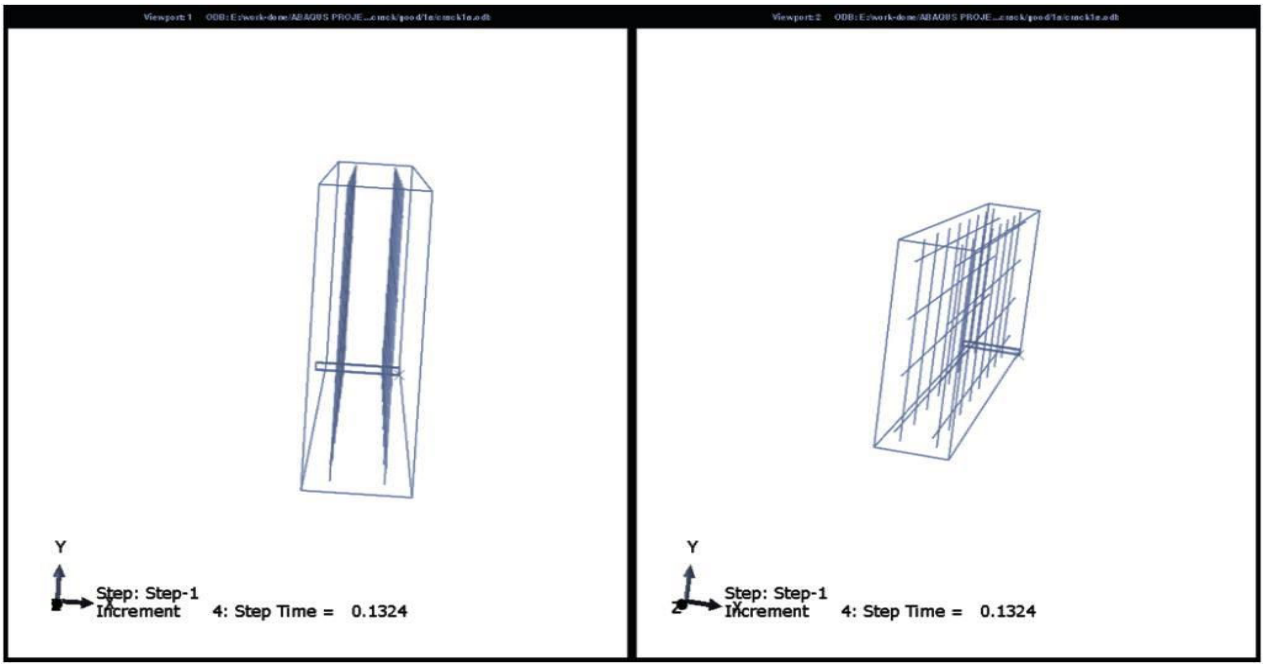


Figure 7: Sample a1

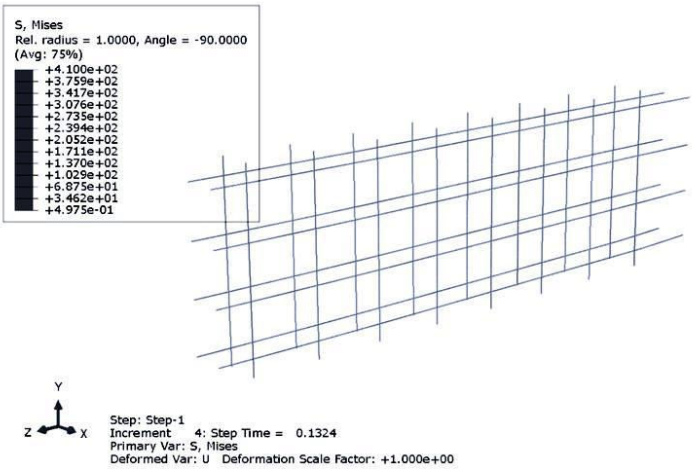


Figure 8: Reinforcement stress tensor

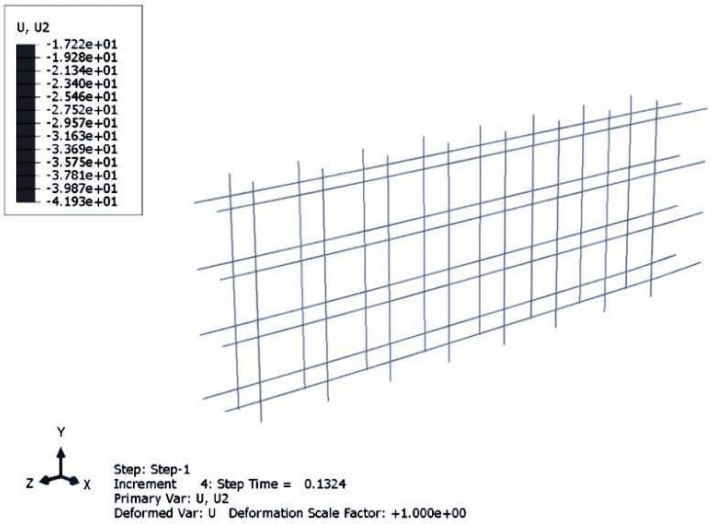


Figure 9: Armature displacement tensor

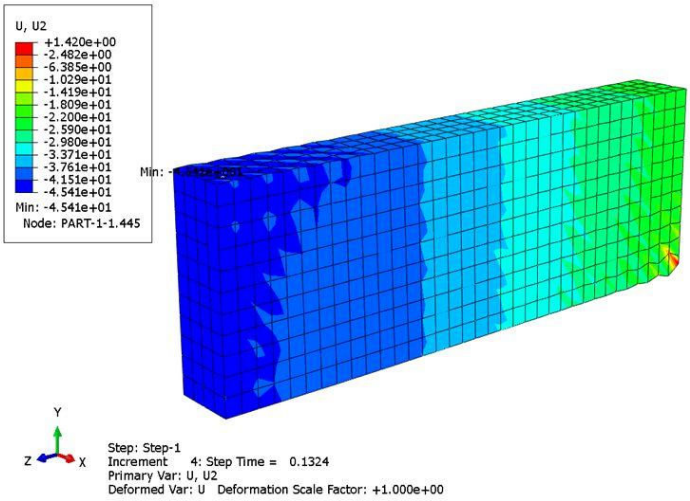


Figure 10: Shift tensor on concrete

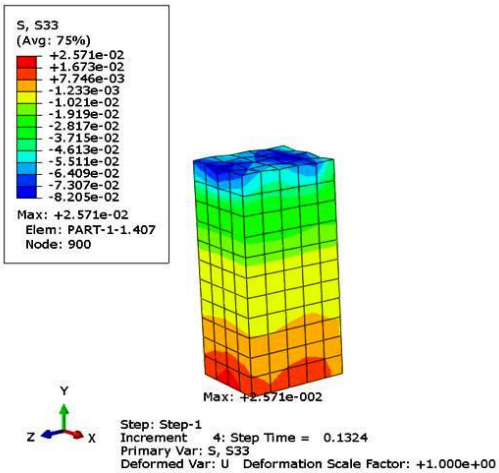


Figure 11: Tensor maximum bending stress

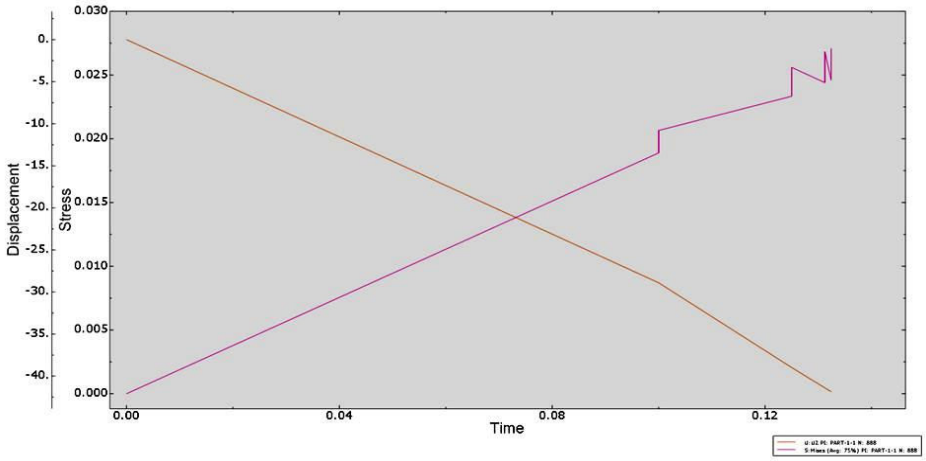


Diagram 3: Changes in stress and displacement, on maximum bending stress

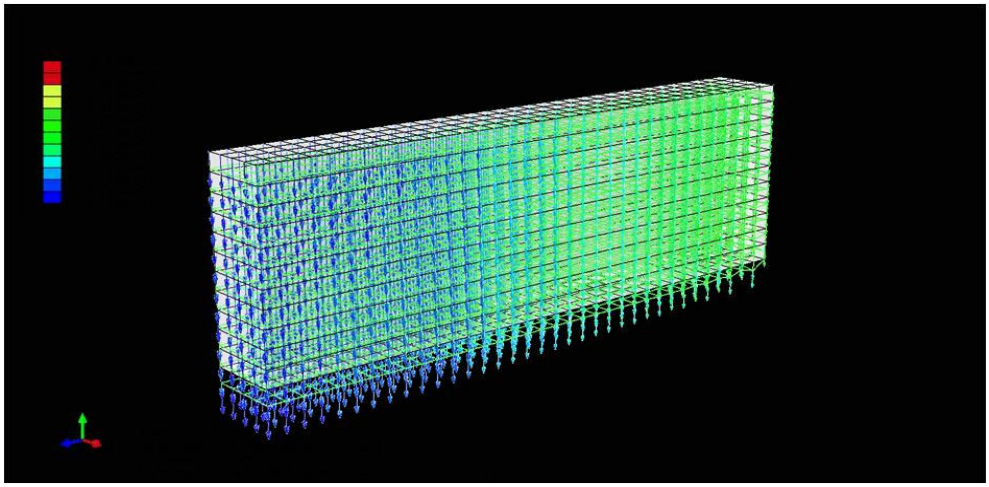


Figure 12: Matches, the initial state of the beam, and the applied load, on half beam

CONCLUSION

Using technology, construction, form constant insulation (ICFS), is an advantage, compared to manufacturing traditional, such that it can be named to run at higher speeds, and higher quality. What, on this paper, it was studied to evaluate the performance (strength and ductility) concrete beams (horseshoe port) without shear reinforcement (Khamoot), which is armed with the equivalent flexural reinforcement, or more than, as a minimum, are listed in section 5-10 regulations ACI 318-99. Research, and improve the calculation of bending, horseshoe port, technology, forms constant insulation, research, and improving the shear capacity is calculated, horseshoe port, which meets the criteria, the minimum flexural reinforcement, and have been without shear reinforcement armed. Due to the increase in the flexural steel in the sample, (observe minimum bending steel in the beams) occurred before flowing steel tensile, shear decline in beam, and were reviewed scientific goal, not the effect of shear reinforcement. This is caused, cheaper running costs, reduce time, ease of implementation, and economic structures Mehr, with technology, molds constant insulation. Recommended to achieve results shed light on future research, will review the following; impact horseshoe port thickness, affect the position of the armature, there is an impact, or lack of, shear reinforcement, shear reinforcement spacing effect, and the effect of the open mouth of a small or larger.

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