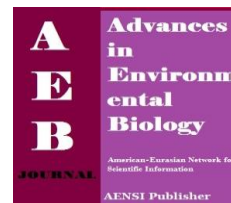




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Applications, Ground Rules and Benefits of Using Sandwich Panels in Industrial Building Construction Systems

Mehran Tirandazian

PhD. Tajik State National University, Dushanbe, Tajikistan

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ABSTRACT

Necessity of using prefabricated modular building systems, with an emphasis on architecture and building regulations of the country in order to localize and adapt to local conditions is designed, and new construction system has been initiated. Study evaluating the structural systems includes a wide array of activities that can be done differently and by different authorities. But what is the current situation we are facing is that although often decentralized activities can be considered establishing such a system has still an integrity. Always planning for any development project requires the selection of a certain building practices. Simply put expertise announce the official results to evaluate the quality, durability and other features of a product or building system using the standard building regulations and guidelines are valid for By the organization and by law shall be provided for a limited time Thus expertise executive director or employee relationship between the designer and manufacturer of consumer choice and application of the product or system layout of the building makes.

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INTRODUCTION

According to the breadth of Iran and climatic conditions vary in different parts of the land required construction methods tailored to the specific characteristics of the region is developed and implemented. Since its activation on one of the belts in the world is earthquake-resistant structures and thus create safety is the priority. The need to evaluate residential units indicates that the young workforce each year about 600,000 new housing units are needed to cover a limited part of the traditional methods of construction. In addition to the new requirements, poor quality of construction caused by the depreciation of existing buildings, which will increase the need for new construction, retrofit of existing structures as well as the issue of the necessary attention, should be given. Due to the broad needs of listed buildings and the need to improve production quality, as are common in most large countries should seriously consider building manufacturing methods. One of the techniques discussed in the last two decades is the use of sandwich panels consisting of two layers of reinforced concrete with welded grid and a layer of polystyrene, which some of the housing projects have been implemented. In this paper we have tried to familiarize the rules, regulations implementing this type of buildings. If you pay attention to these projects you will notice that some of the discussions in fully implementing regulations which are not implemented, for various reasons, including executive limitations etc.

General use of sandwich panels:

Sandwich panels (3D) of at least 4 cm thick polystyrene layer and the network layer are made of rebar welded on both sides. Panels used to choose the width and height of 30 cm is recommended models (Width - 90-120-150-270 cm, height 300 cm), the average weight of each screen size 300 x 150 cm without concrete is lightweight and easily portable and installed by a single worker and speed of installation is significant. Resistance against fire is appropriate and to improve the use of fire-resistant layer is recommended. According to the insulating layer of concrete, the use of these panels, in addition to improving thermal insulation and acoustic properties of the walls will be constructed of light. Apart from reducing the amount of used materials that will reduce the building mass. Use these panels to create restrictions on parking structures, thus providing the necessary conditions for parking on the lower floors of buildings, using a mixed system of metal structures, reinforced concrete, and the panels as the separator attention sandwich is. According to data from the European countries, most buildings have been implemented in this way is one or two floors. Therefore, the design and

Corresponding Author: Mehran Tirandazian, PhD. Tajik State National University, Dushanbe, Tajikistan
E-mail: Mehrantirandazian04@gmail.com

execution of buildings with more floors require special studies and then studies the design engineer needs to be valid regulations.

Benefits of sandwich panels:

- Walls made of light materials compared to other places
- The speed and ease of transportation and height places
- Resistant against shear forces caused by earthquakes
- Insulation against heat, cold, moisture and sound
- Fire resistant concrete segments because the sides of sandwich panels
- Permeability of buildings against insects
- Ability to carry and use of places in areas difficult to construct the building without the need for skilled workers
- Achieving a more useful space due to the small thickness of its walls
- Freedom of action in a variety of projects due to the flexibility of prefabricated sandwich panels parts
- Cost savings due to light weight Foundation and the skeletons of high-rise buildings, pieces of roof and wall sandwich panels
- Cost savings due to the prevention of air-conditioned buildings in summer or winter, a heat exchange or cooling, resulting in less energy expenditure
- Extending the useful life of buildings and equipment installations
- Lack relative influence of noise and relaxation for residents of buildings in major cities
- return on investment in the shortest construction time
- Moving water and sewer pipes, electrical and telephone networks easily panel and Installation frame doors and windows before sprayed concrete and steel coils generally the lowest cost implementation of building installations
- No need for carving and demolition debris facility walls and thus does not generate cost savings and time deposits that are looking for.

The sides of sprayed concrete panels with a minimum thickness of 4 cm, the panels are in no need of mortar plaster and gypsum plaster implementation (Sandwich Panel), wall painting will be ready. Remove horseshoe port on the advanced system places. Sandwich panels with low cost shipping ways. For example one Unit trailer is capable of carrying up to 1,000 square meters Sandwich Panel. Wall and roof sandwich panels used in construction, proper utilization of iron uptake caused. For example 17 kg per square meter of steel wire rod and rebar can be used as a floor of a residential unit built.

Terms of loading, analysis, design and materials:

1 – Scope:

Terms of criteria, sandwich plates (3D) structures composed of these pages is in the can. Prefabricated sandwich panels from the page to the next is called network is composed of two layers of welded steel among which an insulating layer of polystyrene placed by diagonal members are connected to each other. Strength and consistency of these pages by the wire diameter welded to the sides of the grid are provided. These plates so sprayed concrete or concrete as interior and exterior bearing walls are used. Structural sandwich panels consisting of structures which refer to all the loads exerted on it by gravity and lateral plates tolerated. These pages can be used as non-load bearing blade attachment to other components of the load bearing walls of the separator according to the terms of use.

Material properties:

Network welding and wire diameter Welded grid (mesh) with automatic machines is made and should not necessarily be compatible with standard ASTM A85. Profile wire grid welded wire diameter shall conform to the requirements specified in the standard is ASTM A85. Profile Welding wire diameter shall be in accordance with the requirements listed in the Standard ASTM A85. If the current strength of the wire used in the network exceeds the 400 NPA should be as stress-strain 5/3 is considered to be in the thousands. Ductility of the wire used must be in accordance with the requirements of paragraph 4.6 of concrete code. In areas with severe environmental conditions and extreme paragraph 8-2-9-2 diameter galvanized wire you should use the standard specifications is ASTM A797 If the competent authorities of the diagnosis can be made of galvanized welded grid.

Welded wire grid with a pitch diameter of 3 mm and 5/0 mm.

Wire diameter, the minimum diameter of 3/0 mm is.

Insulating layer in between: Insulating layer consists of expanded polystyrene foam having a density of at least nominal standard is ASTM A78. ASTM A84 polystyrene insulation layer under standard laboratory tests to Maximum has the potential heat.

Concrete spraying (Shatrik):

Sprinkle concrete components:

General Characteristics of Aggregates for concrete pour shall conform to the standards set forth in "period of 203" and "201 term" Office of Management and Planning Organization Technical criteria are developed. Nominal size aggregate shall not exceed any of the following values:

A) One fifth the thickness of the free space between the insulating layer networks welded.

B) At least three quarters of the free space between the insulating layer networks welded Note - Grading Standards No. 2 Table 2-1 AC1506R-90 is recommended for concrete pour. If the design engineer after various tests can be a strength concrete aggregate, efficiency, pump reliability, durability and proper closure can make reinforcement of the materials to use. Use materials with needle and scales of up to 10% of coarse grains is recommended. Sprinkle cement concrete shall comply with the requirements of paragraph 3.3 is ABBA. Sprinkle water on the concrete must be in accordance with the ABA Section 3-5. 1-2-3-1-6 - Additives used in concrete to pour the contents of paragraph 3.6 shall conform to ABA.

Mix: The amount of water to cement ratio w / c 40/0 to 55/0.

Do not pour concrete in accordance with paragraph 6.4.2 of least resistance characteristics are determined.

Grade of cement per cubic meter of concrete pour at least 350 and at most 500.

Sprayed concrete method for this type of structure is more concrete spatter.

Efficiency of spraying concrete pump so that its ability to supply. Meeting the appropriate range of concrete (slump) can be taken between 40 and 100 mm. Mixing of concrete sprayed concrete curing in cold or hot weather should be applied as set forth in Chapter VII of the ABA. Ensuring efficient use of fresh concrete, provided the maximum is 90 minutes, followed by mixing. Sprayed concrete at ambient temperature 35 ° C maximum and minimum of 5 ° C is limited. The use of additives must be in compliance with ABA standards.

Sprinkle concrete tests: The best way to pour concrete core is tested. Because of the limitations of this type of structure should be close thickness of the sample cube (wooden or metal dimensions 75 * 460 * 150 * 750 * 750 mm 460 mm or sample used. Samples tested for compressive strength and other tests such as porosity, weight, volume etc. This section covers the status bar samples should be run on the same conditions. Tested for compressive strength of at least three experiments, each experiment consisted of a couple of the concrete core samples were unarmed and for other tests to be taken at least six cores of reinforced concrete sections. Test cores shall be "ART 65" done. Evaluation of Core Samples must be applied in accordance with Section 6-6-5 of ABBA.

To evaluate the quality of such experiments can pour concrete test hammer, the Schmidt, pulling out the steel and the sample standard cubic or cylindrical molds, etc., may be used in accordance with the relevant standards.

1-3 - Profile and Analysis:

All except loads, earthquake loads to the structure should be based on standards of 519 titled "Minimum load for buildings and technical buildings" to be determined.

Compliance with all criteria listed in computing seismic behavior factor maximum of 15 available.

Analysis of planar structures and material properties, geometry modeling, they shall be permitted ABA Section 3-10.

Application of composite sandwich panels in the world

Properties of composite sandwich panels, such as the choice of appropriate products in construction is proposed. In recent years, little work has been seen to produce panels in the building market. Nevertheless, many outstanding potential advantages for using such panels in big cities are facing the problem of shortage of space there. The following article is taken from the references listed at the end of the story, to express the experience of several countries and explores the reasons for not welcoming places

Europe and America:

Use wall and sandwich panels have been growing in the past years in Europe and American. The walls are designed to build prefabricated houses, due to its many advantages such as durability and good performance, low weight, easy assembly and rapid increase energy efficiency in buildings, have noticed many of the leaders in the construction industry. For example, Advanced Technologies Building, in order to promote innovation in the U.S. construction industry, financial aid worth 1.1 million dollars has been awarded to an industrial project. Winners of these scholarships, a manufacturing company shows the composite panels are coated. The panels are interlocked to install some extra help. According to the company, even if a construction worker is assigned desperate to assemble panels, build a house of 110 square meters with three bedrooms and two bathrooms this panel, takes more than a days. Price houses built with this material, total cost, including kitchen, wiring, plumbing, heating systems and appliances is estimated at approximately 786 and \$ 28. Experiments have shown that this house cans even storms and earthquakes as well as strength.

India:

Welcoming these panels are not unique to developing countries. The use of composite sandwich structures in many Asian countries such as Thailand and India has also been considered. Technology assessment and forecast of the Indian Council (TIFAC) which is responsible for the development and implementation of advanced composites Production and development of these composite panels to put on its agenda seriously. Places for production, the natural fibers and coatings for flat screens figure Pallet hydrogen process form and then using foam core composite panels are produced. The panels in the construction of buildings, and even the ceilings are used in the same boat. Inexpensive sources of natural fibers are found in abundance in India. This factor has led to the development of the Indian capital spending lots of natural fiber composite technology to the construction industry.

Iran:

Of population growth and increased demand for housing and living environment has led to greater demand for smaller, faster and cheaper to build increases. Promoted by partitions, false ceilings and walls in recent years, confirming the claim over the past years activities by large and small companies to manufacture sandwich panels has been made. Prefabricated walls produced by the Institute for SAP building is in fact a kind of sandwich structures. A foam core sandwich panels produced at the institute and is composed of layers of reinforced concrete. A foam core sandwich panels produced at the institute and is composed of layers of reinforced concrete. In fact, a kind of kiosk wall structure with core sandwich structure similar to bees and lanthanum layers are made of fiberglass. Where the use of fiberglass in the construction of walls and ceilings that are produced by small workshops can be seen in the market.

The reasons for not welcoming places in the country The absence of extensive construction places all over the country, we may be influenced by the following factors:

A) Price High:

The main reason for this high price compared to fiberglass, wood and other materials used in the production of false ceilings and walls. Since the price of raw materials and the cost of making the panel (which is often slow and costly method of Chinese handicrafts are made from layers) are higher, typically using conventional, traditional materials such as wood is the treatment.

B) Insufficient quality:

The second factor in the lack of uniformity in the quality of products, not so nice for such products must be searched. Due to the lack of mechanized production of composite sandwich panels, usually made of a uniform product quality level is not available. However, many common products such as wood panels or panels made of MDF Frimika coating material help (HPL) beautiful shape gain for consumers is much more appealing than the fiberglass.

C) Low production rate:

Another reason is the slow methods of production in the country.

Many of these products are produced in small workshops that very basic technology, and is based on work produced. Obviously, the lower the production rate of the manufacturing process Non-mechanized sandwich panels can meet the needs of an expanding market.

D) Low level of technology:

These reasons can be set at the lower level of the composite panel production technology summarized. Boost domestic production facilities, technology and applied research can be an important step toward improving such composite products in the country to be considered. However, at present, Iran Polymer and Petrochemical Institute, a research project in the field of application development in the country is running a structural sandwich panels, answering the need of extensive market research and budget spending is much higher.

1) Composite sandwich panels:

Places commonly refers to those structures that are composed of a central core is weak and the strong outer layer. These places are usually built of glass fiber composites (fiberglass) and natural fiber composites have been used recently. A sandwich panel is actually made up of two main parts: First, the central core is weak and often bulky other strong, usually thin shells which are located on either side of the core. Usually a weak central core of foam or honeycomb core composite fibers and shells located on both sides of glass or natural fibers are made. This seemingly simple structure due to their apparent similarity with the sandwich of the same name is called, the benefits and capabilities of a wonderful show. A sandwich structure, the resistance is much higher than their individual components and also having a wonderful lightness. The relatively low cost and the ease and

speed of construction can be used. After profiles and products made using open molds, composite sandwich panels used in the construction industry is the most important.

In the past, these panels were prepared by Chinese film hand and open the form, but today thanks to industrial processes, speed and quality of these products has increased greatly extraordinary. This reduces the cost and increase the products are welcome. In addition to construction, the use of sandwich panels in a variety of aerospace, automotive, shipbuilding, etc. can be seen.

2) The advantages of sandwich panels for structural purposes:

What places as suitable alternatives in the construction world has posed as follows:

2 - Great style:

Due to the use of lightweight materials in the core of the panel, the panel weighs heavily reduced. A cement or brick wall sandwich when compared with similar samples up to 50 times lighter. This particular style of building, it is important to deal with earthquakes and reducing infrastructure costs.

Conclusions:

Despite the stylistic wonderful places, this product extraordinary resistance against compression and impact loads is various. The panels absorb and force a good show higher resistance than wood. This issue is of particular importance in the construction of walls and ceilings Resistance to corrosion and rot. Unlike conventional concrete wall panels such as moisture-laden air and environmental conditions are not damaged due to corrosion. This makes the cost of repair and maintenance is minimal. Compared with wood partitions panels have a lifetime several times humid environments.

Also, due to decay, in terms of health and worry about the germs to accumulate leave the building.

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