Вышеуказанные обстоятельства определяют актуальность разработки конструкции, технологии и оборудования, которые обеспечат использование низкокачественной древесины в производстве широко применяемых в строительстве щитовых элементов.

Щиты характеризуются улучшенными показателями плоскостности (отклонение не более 2 мм/м) и волнистости (не более ± 0,2 мм) по отношению к распространенным изделиям с традиционным брусковым заполнителем. Плотность щитов с заполнителем из круглой тонкомерной древесины и наличием пустот, составляет 370...500 кг/м^3.

С учетом условий применения изделий возможно изготовление трехслойных щитов толщиной 20...100 мм, шириной 200...1000 мм и длиной 500...2000 мм. При необходимости, они могут быть облицованы строганым шпоном или другим декоративным материалом.

Трехслойные щиты с торцовым заполнителем из древесины могут быть использованы для изготовления дверных полотен, межкомнатных перегородок и других изделий строительного назначения.

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THE CONSTRUCTION TECHNOLOGY EVOLUTION WITH THE PURPOSE OF ENERGY CONSUMPTIONS REDUCTION AND SAFETY INCREASE IN WOODEN HOUSE-BUILDING IN ITALY

The Italian legislation and government aim to address designers and manufacturers to the construction of more sustainable buildings and with a decreasing energy consumption; this is associated with increase in the technological performance of the manufactured goods production for construction that makes the realization of such constructions faster and cheaper, relatively to the result achieved. In this direction the incentive of wood construction, seen as the first material constituent the construction elements itself, has undergone a consistent increase compatibly with the recovery of a construction textile that has considerable historical - architectural and landscape quality.

Today following the dark years in which the use of concrete has spread as a result of the ease of modelling and the simplicity and security in the implementation of lugs, and then to an even more dominant use of brick bearing the costs of production, packaging and laying relatively low, the attention to a more careful search of housing and working comfort has led the world of architectural and technological design to consider constructive possibilities that

combine primitive building materials with the new technologies of the XXI century. In this direction it is clear that the wood derivatives and the building techniques so-called “dry” fit overbearingly in this viewpoint.

Moreover, Italy that has signed and ratified the Kyoto Protocol is practically free of raw materials, therefore, is extremely careful to use the primary materials for the production of manufactured goods for construction as well as to the sustainable exploitation of them. It is known that in Italy the territory is considered to be an exploitable resource, therefore, it needs to be reintegrated for sustainability and urban planning.

In this regard, the concept in the construction industry has always embraced more the view of interaction with the environment in which it is inserted and the man who uses it, whereas, considering the building involucre and its technological contents as an active machine and not as a monolith that is used passively.

The European Community that is highly attentive to the sustainability themes has issued a series of directives that each Member State has implemented with its own regulations that are revolutionizing the way of construction according to the energy resources exploitation. Today in Italy, beyond the obligations in plant constructions, there are also contemplated obligations in building technologies.

Italy has been divided into so-called thermal zones on the basis that, while in northern regions of the Alpes winter temperatures are around -20°C and the hygroscopicity together with the wind make the conditions of housing constructions heavy; in the south the solar radiation is almost equivalent to the North African regions with the temperatures of +40°C in the shade, this may cause the warm-up of internal volumes due to the thermal inertia of building involucres. From this we can understand how the technological housing construction typologies in Italy are radically different from region to region and how rarely the transplantation of forestry technologies is possible.

Nevertheless, in Italy the wood as the primary construction material has always been present throughout all its territory, although the country is not provided exceedingly with them.

Today the technological packages that meet the law application regarding the sustainability more often take into account the plant-derived elements, particularly in dry outputs that have an excellent performance in terms of housing comfort and a high resistance to seismic actions as well as the recognition of the structural behaviour in fire situations that makes the intervention of rescue teams safer.

Such technological solutions of building involucres are multilayer solutions where each layer should help to give an answer to a particular act of nature. Thus, for example, an external insulating layer placed at the outer barrier of a construction element, endowed with an important mass, helps to slow down the process of thermal shift, i.e. that process that, especially in the southern regions of Italy, helps the night temperatures not to mitigate by the effect of daily overheating of the perimeter walls. Similarly, during the winter months in northern regions the ice put on the vertical surfaces by means of wind will find an appropriate barrier slowing down the cooling of the internal bearing and structural surfaces with great thermal inertia.

For this purpose, the wood having a low thermal inertia allows to create vertical and horizontal septum with low intrinsic mass and, consequently, with low inertial mass (seismic

actions) and thermal mass (weather) even with constructive measures significantly reduced in comparison to the same concrete (CLS) and bricks constructions of the last generation.

The last but not the least, the solutions in wood are particularly suitable in the elimination of thermal bridges due to the gap in technological construction stratigraphies in some building nodes, as the material workability makes it suitable for all possible constructions.

Generally in Europe the timber constructions have always found a wide application even in sophisticated architecture. An application example is the "Timber Tower" of Waugh Thistleton (Murray Grove, London, 2007). This construction completely built in laminated wood has permitted to save several hundreds of tons of carbon dioxide emissions in the atmosphere rising for nine floors with angular balconies on each floor.

The technologies related to the wood constructions can also be CLS mixed and plant derivatives, resulting in an optimization of surfaces that must satisfy both the exceptional mechanical performance (walls against the ground and restraint walls for the land steps construction) as the performance of energy consumption containment. In this regard, the production of plant-derived blocks uses timber production wastes inerting and mixing them with combining mortar; thus, obtaining quarterdeck blocks of various shapes and thicknesses, some with an insulation slab already installed, which do not require mortar or binding for the erection using only the joints between the blocks. Subsequently these blocks will be disposed internally creating a concrete septum which will give the vertical septum with the required mechanical and energy performance. Moreover, these blocks are characterized by a good environmental sustainability.

While in Russia the problem of summer conditioning is not felt a lot, in Italy it is one of the reasons that determine the greatest energy expenditure, particularly of the electric type. Vice versa, the winter climatization of the residential volumes, offices and more generally of the rooms where the people are present, is extremely burdensome in Russia. So, in both cases the problem of wood construction is to provide hollows and technical spaces that can be equipped with pipes of both the fluids as the electric types. In addition to the structural problem, designers and constructors should be especially attentive to the implementation of calcium silicate plasterboards suitable to hold fire, smoke and heat between anti-fire compartments.

In this regard, Italy is developing and expanding the production of hot and cold fluids, that may be of use in summer and in winter, by means of geothermal heat flow pumps. This technology allows not to distribute fossil fuels inside the buildings realizing the production of these fluids by means of electric power assisted only by enthalpy that water, air or land are holding. In this way, an eventual realizing of stoves and ovens entirely with electricity will made the fossil fuels be completely excluded from the real estate provisions. It's clear that in Italy there is a possibility of exploiting of a lot of solar energy that radiates this country because of its position, where the solar radiation varies from 800 to 1200 kWh/mq per year.

Such contribution permits not only to produce hot water or heating, but can also produce cooler fluids in summer by means of absorption machines.

The electricity consumption aimed to produce all these sources of energy used for construction can be amortized by the use of photovoltaic panels that have government incentives in Italy and other EU countries (who more or less); thus, creating a virtuous cycle of energy self-sufficiency of every single construction.