

Materials: an informative tool for a best informative quality in the constructive sector

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Build information to give information

The study presented, is the contribution of the team of researchers participating in the program of activities of Lama - Laboratory of the Materials for the Architecture of the DARTE, University of the Mediterranean Studies of Reggio Calabria, with respect to the methodology for the control and improvement of the quality of buildings. The team has made an information system on Materials Products and Components, Materials, active on the WEB and in testing phase.

Keywords: Technical information Crisis, Design Control, Informative Specialization, Production sector, Decision Support Systems.

1. The General Problem list

The mode of design are radically transforming in recent years, due to the mutated cultural context, the new boundaries of technology, of the renewed information possibilities: factors, that determine a new freedom for the designer and that allow to explore the field of complexity in the actual architecture panorama. With respect to occurrence of this complexity, it becomes important to confront the actual constructibility of projects: investigate the potential of innovation, the new arrangements for the building industry oriented more toward flexible systems of production, the opportunities for new materials and components transferred from other areas. The interest for the network communication, the ease with which can reach the information sought, the enormous range of data and images to the internet, have plagued the world of design.

The rapid dynamics of innovative industrial production in the sector, in addition, together with the confusion that characterizes the transfer of technical information and the regulatory aspects in the field of building construction, it does not allow, increasingly often, an easy structuring of knowledge and an acquisition of information useful to the project definition of architecture and its innovative characteristics associated with the current instances of efficiency and environmental effectiveness, energy savings, durability, etc.

This fact is of extreme importance.

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Often, in fact, are precisely the designers, who, however expressed, cannot access linearly to the wide landscape of existing technical information (production, Enterprise, regulator). This is probably to be placed in close connection with the dynamic innovative rapid production world that doesn't allow easy structuring and utilization of knowledge. A great deal of confusion, in fact, characterized, generally, the management of the transfer of technical information and standards within the construction industry. The necessity of passing a similar cultural gap, which risks to regress the quality of knowledge brought contemporary requires technical structuring informational analytical knowledge paths – crosshair critics to the redefinition of the complex landscape of technical information related to the project.

The themes of *Design Control and of Information* as an instrument of Control and Technical-material innovation, represent, then, the new categories effective to decline, in updated way, the specific theme of Production of the Project. The open questions, proposals, are so the issue of structure information, integrated, critically, from a question of specialization information for the control of the design process. A key ring, therefore, to combine the paths of material's knowledge to the control strategies.

2. The scope of scientific inquiry

The integration between the technical knowledge, available resources, the social organization and the translation in question of the individual and collective needs, can still be identified as a preferential path for improving environmental quality and not urbanized.

In line with this, is need a reaffirmation of a design culture that, through the acquisition of a widespread culture of build, proves able to legitimize the work choices. This is because, increasingly, the buildings cost too much of management; have a too rapid obsolescence; need too frequent maintenance and often are not programmed. These serious failings, surely attributable to very different causes, but they are mostly caused by shortcomings in the design process. And so, the construction product quality can be guaranteed only through the identification of new audit methodologies and tools.

In this context, then, the designer must manage an increasingly wide range of knowledge, and a diversified flow of information. The large number of people involved in the building process, the complexity and size of the final product, the need for different types of representations and technical verifications during the design phase, the variety of professional specializations of components and materials required for the building construction, in fact, make the construction industry, an industry with a high information content.

In view of this consideration, the most immediate realization for researcher who investigates technical information tools in the current landscape, is the absence of unifying landmarks, which organize the production of informative documents on building products according to

rigorous accession criteria technical standards in force. Also on the information consumption, typological highlights the lack of a unified repertoire. Consider, for example, to transfer out of context-based approach to compliant solutions – from manuals, catalogues, directories, etc. - to the project. The result of this trend is that the technical information is supplied by producers in a substantially different manner, especially in terms of quality of information content. What can be surmised, on the other hand, is the Organization of instruments that convey the information on technical, technological and quality materials of components or systems. First of all, in this sense, a good point from which to start studies in accordance with these guidelines, is discoverable in UNI 9038. The various paths of study and research oriented, to define a higher quality standard for unified information dissemination in the construction industry, have also had to cope with a landscape extremely complex and varied merchandise. With reference to the issue, the study's objective presented, provide a contribution to the development of an information instrument, capable of integrating the existing conditions of design development, ensuring control of operational choices in the conduct and development of the project.

3. The research path

Given the overall objectives, has formalized a methodology that considers, in an integrated unit, the subject of quality of technical information for the project's control.

The development of that phase is structured around a task critical acquisition of documentary and regulatory repertoires products domestically and internationally, in order to reconstruct the most significant references to catalog the operational experiences, updating the status of knowledge on the meanings of: *informative Instrumentation; information transfer; appropriateness; roadworthiness tests*; bringing these insights to the following consequences:

-acquisition, management and transfer of information on materials, products and components;

-modeling of instruments aimed at improving the quality policy.

In this logic, this cognitive phase descendant from the processing of the data acquired during the investigation, detection allows the definition and construction of a data base system, the contents of which constitutes the object of the subsequent realization of Informational Pathways, which lead to the achievement of results expected output.

3.1 The classification system adopted

The methodological path used to process the information system, developed from the definition and adoption of an appropriate classification system to data acquisition and the subsequent processing and delivery of technical information on products, components, materials.

The goal is to provide useful information for both the didactic activity, oriented to knowledge of materials, their characteristics, compatibility and applications both of the professional activity, oriented to knowledge of new scenarios, productive and constructive materials.

The first step involved surveying and analysis of some aspects of the main systems of classification. These are provided by the major existing training bodies and the thematic content of the survey of the most important technical information portals currently on the net. The recognition of such materials, has made possible to identify many issues related to the lack of common definitors apparatus, including the identification of categories of use too generic and, therefore, ineffective informational purposes. The same reconnaissance, allowed to identify in PC/sfB classification system, a first possible reference suitable objectives in charge. The SfB system identifies as basic principle in relation to the stages of the construction process, that the choice among those *available resources* are transformed by *construction activity* in *definable results* in amounts and positions as parts of a building. The salient feature of the SfB consists precisely in his particular decomposition approach of a building or a project into parts, each part can be considered under three main aspects:

- the *function* for which it is created; is the view of the user: the part so regarded is a building element (table 1: elements);
- the *way* in which it is created; is the view of the constructor as well considered is a processing (table 2: processing);
- the *material* with which it is made; is the point of view of the producer so regarded is a material (table 3: materials).

With regard to the above, the field of investigation on the SfB, was restricted to: Processes (table 2) and materials (table 3).

Table 2 content was deduced the formalization of the first draft of the classificatory system on representative products and components the current production offer; the Table 3 was deduced, instead, a first hypothesis, material classification for defining the production offer, in terms of products and components.

4. The final product

Identified, therefore, the cognitive basis of reference, we proceeded to the formalization of a methodology that includes the definition of an informatic container, structured through information paths, based on the use of relevant databases (materials, products, components) between their related and modeled in relation to levels of informational character output, referring – in the design phase-the definition and control of the choices of executive and technical nature.

The investigative path articulate, so around the construction of a tool for decision support (DSS) – informational database, able to assist a specific users to make decisions – details will, as a result, operating an information tool to satisfy a request information through the

articulation of a broad and structured response to cover up, outboudan application developed, inbound, intersecting differentiated areas.

The phase of modeling, represents the moment in which the debugging of the instrumentation is formalized predisposed for achieving the construction of an informative tool, flexible, manageable and implementable online; based on the theme “transfer of the information and control of the design process. This will be, therefore, possible through the development of a first general model that, the system of connection among the different informative paths, formalizing the following path of support to the design:

- informative path duct through the definition of the *Constructive Actions* (or Categories)
- informative path duct through the definition of the *Use Classes*
- informative path duct through the definition of the *Product Classes*
- informative path duct through the definition of the *Material Classes*
- informative path duct through the definition of the *Landscape products*.

Departing from the precedents acquired theoretical presuppositions, the team of researchers inside LAMA have elaborated The Archive Products of the LAMA, *Materials*, an informative Database that, through a whole correlated files according to a logical relational model tree, allows to offer a specific informative quality.

Flexible and implementable, *Materials*, is an innovative instrumental apparatus that captures information on products and components from the world of production. The peculiarities of *Materials* consists in processing these incoming data, placing the products/components in the database, within the classification system adopted.

Materials, usually done through alternative demand conditions, bases its user interface on defining a path of investigation managed by software (DBMS) applications with client-server structure and query language, allowing, through the management of a set of alternative conditions related archives of dialogue: free research, single criterion or multicriteria.

Its consultation keys are:

- *Categories* (Constructive Actions)
- *Uses* (functions of technical elements)
- *Products* (product types)
- *Materials* (material classes).

The four groupings provide a tree structure, which, starting from the identification of the general definition of the functions of the technical elements (Uses), arrives at the

specification of the product offer, through the identification of the products (Products) to each specific use Class.

The branch of trade covered range from raw material to completion, following all building construction phases: structures, roofs, external closures, insulation, etc. Not specifically treated currently are special spaces devoted to machinery, construction tools and services.

Categories (or Constructive Actions) of the system, useful to orient in a designer targeted its research, are seven and precisely (fig. 1):

- Support loads
- Cover and repair
- Separate and divide
- Waterproofing and insulating
- Finish and complete
- Improve yields and performance
- Restore

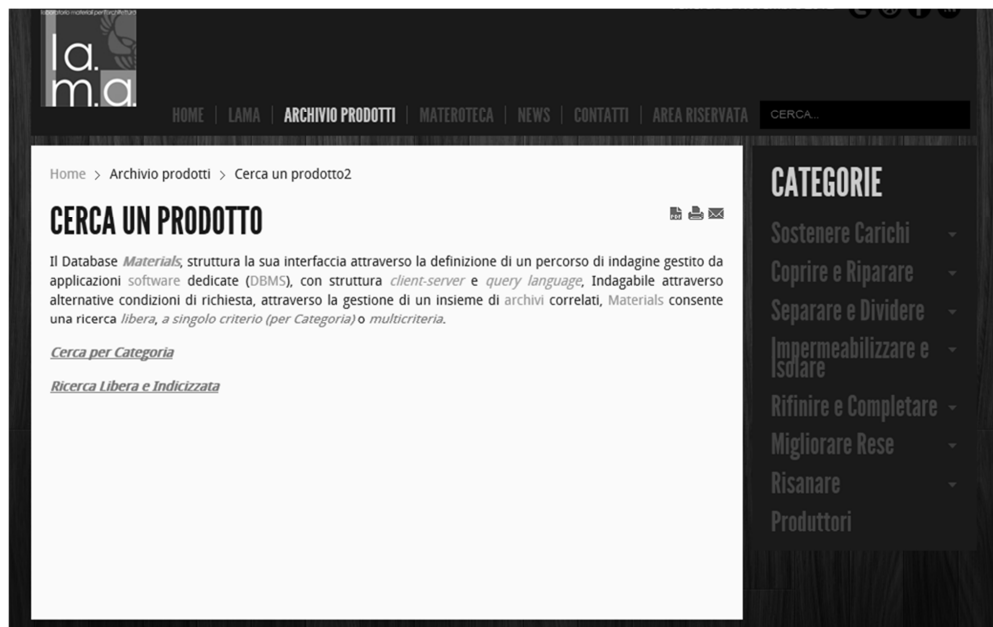


Figure 1, To the right screen, the Categories of the System, related to System “Materials”. In the central screen the different research modalities (free research, single criterion or multicriteria). Provisional website filed to www.lama.unirc.it .

For each *Action*, it can see the different *Use Classes*, representing the rational selection of individual functional parts of the building and/or some processes.

For each *Use Classes* it can consult the different classes of associated product or set of products and components offered by the production for that specific use. Classes represent the informational database paths, on which were designed, interrelations through tree structures between *Use Classes- Product Classes-Materials Classes*. The archive includes all products that have an interest in design and construction of civil works (residences and infrastructure). In general we may say that the catalogue extends to those branches of production related to the sectors of construction, architecture and design.

By way of example, the screen of the first entry of the Categories, "Supporting loads", with an indication of the Use classes corresponding in related right part (fig. 2).

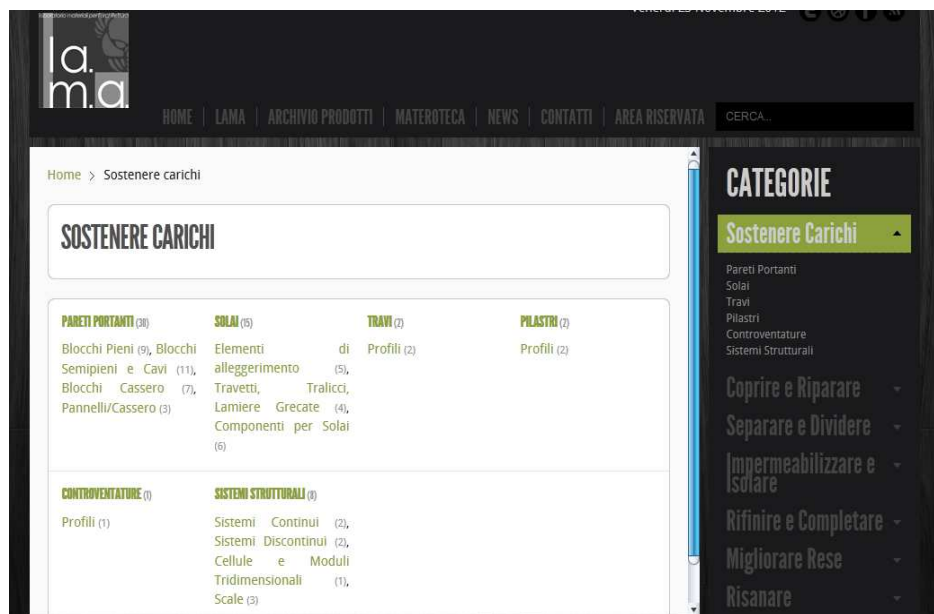


Figure 2, First item of Categories, "SUPPORT LOAD", indicating the Use Classes related, in the central screen. Provisional website, filed to www.lama.unirc.it.

In the central part of the screen, are received Product Classes (fig3), related to the individual classes of use listed. For each product class are highlighted individual products related to specific use, with a final technical specifications, as well as a short description, indicates some basic information and direct connection to the company, to contact for further information.

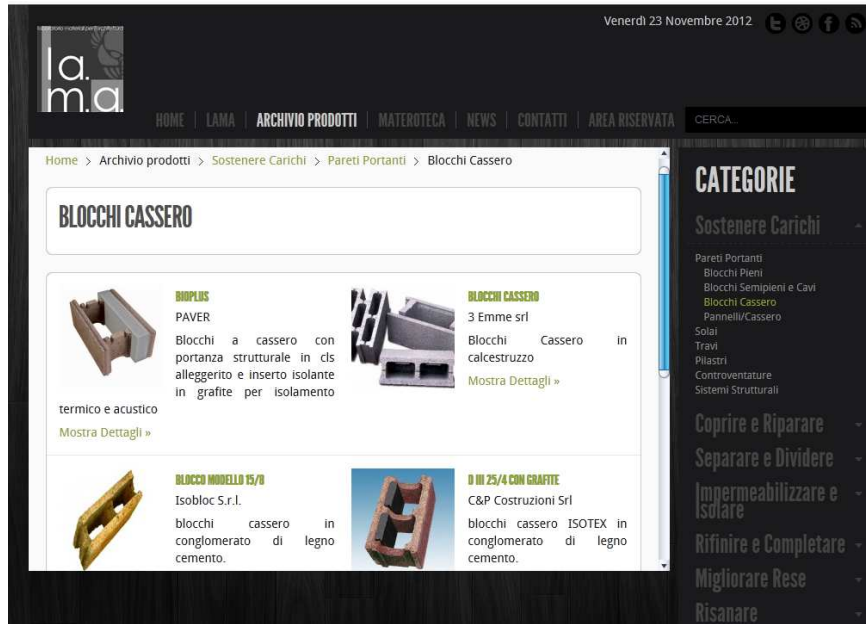


Figure 3, Product Classes “Block mold “ related to a single Use Class “Load-bearing wall” of Categories, "SUPPORT LOAD". Provisional website filed to www.lama.unirc.it.

Materials, in fact, consists of a set of product sheets (fig4), which describe, in detail, a product from commercial description, specifications with product images, applications examples, realisations, the specifications, the variants etc..

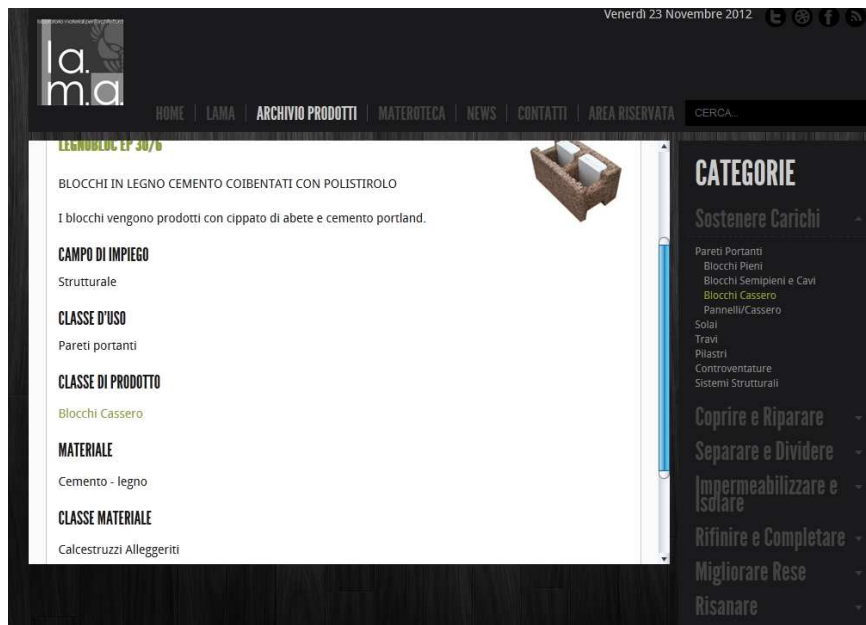


Figure 4, Example of Technical Sheet with different voices: Field of application, Uses Classes, product Classes, Material, Material Classes. Provisional website filed to www.lama.unirc.it.

Follow link to paper catalogues in pdf, cad blocks, videos etc ... Through the consultation of product designers and companies can not only be informed but interact directly with manufacturers, requiring information electronically and in real time directly to sales offices. The product sheets are made from technical editing of *Materials*. All the material (texts, images, attached files etc.) posted in tabs is absolutely original and reworked from material provided directly from the manufacturers product holders.

5. Conclusions

At the end of how much illustrated, it shows a picture of final thoughts on research conducted which investigated and studied the specific issue of transfer of information to the control of design process given the methodological structure and strategic objectives achievable with their use, the DSS, in spite of the apparent discrepancy between the managerial scope from which originate, and the construction sector, which, in this location are applied, were here, considered responding to be adopted as a conceptual model for the delineation of new information on the real character paths the current landscape of industrial production. This is because these instruments have proved to be congruent to meet the special needs of current cognitive and informative view of the production of the building project.

Archive WEB platform products, *Materials*, run by a relational database, network deployable and useful for updating of scholars and designers, can be considered a current information source that refers to the current material universe of industrial production of the construction industry, combines specialized information needs with the evolutionary dynamics of computing equipment, achieving a desired structural gap exceeded inadequacy of current landscape of technical information.

The result, operating, so strongly a support tool evaluation and cognitive activities, geared to mitigate the incidence levels of decision-making design process uncertainties. Such action, able to structure the motivations of the choices by having to conduct, through the use of selected information, proves to be able to contribute to the acceleration of informative and knowledge of technical materials and innovations to the affirmation of their application.

A support tool, so that through the special operations platform, is an instrumental apparatus which, thanks to its open structure, is able to acquire additional contributions and information coming from the network itself, and, therefore, in terms of information content, being able to self-sustaining. Ultimately, a location can offer a structured information that combines the features of a scientific hypertext with the most traditional type information in a comprehensive way.

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