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GLOBAL DATA BANK STRUCTURE FOR BUILDING PROCESS

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Data bank, Information, Classification, Selection.

Abstract

The topic of this paper comes into the studies relative to the information treatment in building process. The author relates about the operative development of a proposal already advanced in a previous report, concerning the particular structure of a Global Data Bank for Building Process, whose characteristic is the possibility of an access to selected information according to the users requirements.

1. Introduction

The design process develops following a choices sequence which carries out, on the basis of one project specific requirements, the definition of each part of the project, as they are more detailed, in relation to their constructive, qualitative and quantitative characteristics. In building field, everybody knows how difficult the information research is at the different levels of such sequence development; information in order to know the alternative possibilities of a problem solving; information in order to evaluate the greater or the smaller benefit that each solution can bring to the whole project.

The information is a resource for all the persons acting in a definite field: it must be exhaustive and appropriate, but "...the informations which are not subjected either to a control or to an organization, are no longer a resource but, on the contrary, become the principal enemy of the acting person..." (1); an information research problem exists, a problem for a selective access to it will exist too.

Research paths proceeding step by step towards a problem solution, may be helpful more than ever to reach the possibility of making choices based on objective motivations; as proposed on other occasions, it is possible "...to get ready a computerized operative procedure in order to find out the informations pertaining to a project..." (2); in other words, it is possible the construction of a data bank organized in such a way as to allow an access "aimed" at the information.

2. The data bank structure

The means to rich the pursued objective were singled out in the systematic application of the Piano di Classificazione PC/SfB (3), whose codes are utilized so as to allow different accesses to informations organized in a selective way according to the codes themselves.

The data bank consists of two blocks:

- the selection block: it consists of the whole codes and descriptive items of the subjects whose information is needed;



- the information block: in consists of the informative analytic data relative to the subjects.

The selection block interacts with the information block by means of a research path that permits to identify (from the general to the particular and through successive options on alternative possibilities) a design problem solution; the access to the informative support, at the different option levels, allows a steady evaluation of the identified solution (see figure).

3. The selection block

The selection block is a kind of shelving in which the subjects descriptive items are arranged in relevant files; the files are linked one with the other by means of cross-references such as to make possible the research path progress.

Three basic files exist, which are exhaustive of the subjects collected in them: elements, constructions, resources; the three basic files generate other files, which come from the combination (following congruence rules) of the subjects collected in them; the subjects contained in the derived files are therefore subjects which are selected according to their fitness to supply an actual constructive meaning. The access to each file and item which are present in the files occurs in an univocal way and through a four positions complex code; the first three positions are characteristic of the three basic files; the fourth position is a reference number of four figures; in relation to the file type, each position may be replaced by an absent code: "*".

The files access code are the union codes (4) of the Piano di Classificazione PC/SfB; within the files, the single items are identified by PC/SfB specific and general codes.

4. The files

Basic files.

Elements: it contains the list of the functional parts of building.

access code	(--)***	elements
one item code	(21)***	external wall

Constructions: it contains the list of the technics for the elements realization.

access code	*_**	constructions
one item code	*F**	brickwork

Resources: it contains the list of the means (intellectual, economic, material, human, instrumental) necessary to carry out the construction ; it consists of three sub-files.

Generic resources

access code	**-*	generic resources
one item code	**g*	clay (dried, fired)

Definite resources

access code	**--*	definite resources
one item code	**g2*	fired clay, ceramics

Specific resources

access code	**-------	specific resources
one item code	**g2.0012	facing bricks

Derived files.

Localized constructions: it contains the list of the constructions selected in accordance with their capacity to implement a determinate element; it is built by means of a comparison between the elements and constructions files.

access code	(--)_**	localized constructions
one item code	(21)F**	brickwork in external walls

Finalized resources: it contains the list of the resources in accordance with their capacity to be utilized in a specific construction; it is built by means of a comparison between the constructions and generic resources files.

access code *_-* finalized resources
one item code *Fg* clay (dried, fired) brickwork

Localized resources: it contains the list of the resources selected in accordance with their capacity to be utilized as a primary resource in a specific construction, in order to implement a determinate element; it consists of three sub-files.

Generic localized resources: it is built by adding the localized constructions and the finalized resources files.

access code (--)_-* generic localized resources
one item code (--)Fg* clay (dried, fired) brickwork in external wall

Definite localized resources: it derives from the previous sub-file, where the generic resources are replaced by the congruous definite resources.

access code (--)_--* definite localized resources
one item code (21)Fg2* fired clay brickwork in external walls

Specific localized resources: it derives from the previous sub-file, where the definite resources are replaced by the congruous specific resources.

access code (--)_--.---- specific localized resources
one item code (21)Fg2.0012 facing bricks brickwork in external walls

Works: it contains the list of the elements identified according to the construction and the primary resource which are necessary to implement it; it derives from the specific localized resources sub-file, where each resource is linked to the compatible constructions when it is utilized as a primary resource.

access code (--)_z-.---- works
one item code (21)Fz-0690 external wall in facing bricks brickwork with cement lime mortar

note: In the access code to the Works file, the code relative to the resources: -- is replaced by: z-, union code of the operations (which involve human and instrumental resources) and material resources; that is because (as stated above), in a Work, besides the primary resource, also all the other resources necessary to its implementation appear (5).

5. The research path

If an uncertainty situation is hypothesized about the solution that can be adopted for an element design, the research path develops, through the selection block files, following successive stages and identifying everytime more and more detailed subjects; for example, the research path for an external wall might be:

-stage 1- Identifying the element code:

(--)***

(--)***: Elements

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(13)***: Floor beds

(16)***: Retaining walls, foundations

(17)***: Pile foundations

(21)***: *Walls, external walls*

(22)***: Internal walls, partitions

(23)***: Floors, galleries

(24)***: Stairs, ramps

.....

-stage 2- Identifying the congruous localized constructions:

- (21)_**
 (21)_**:
 (21)E**:
 (21)F**:
 (21)G**:
- Constructions in external walls
 Cast in situ work
Blockwork, brickwork
 Large block, panel work

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-fase 3- Identifying the congruous generic localized resources:

- (21)F-*
 (21)F-*:
 (21)Fe*:
 (21)Ff*:
 (21)Fg*:
- Blockwork, brickwork in external walls resources
 Natural stone
 Precast with binder
Clay (dried, fired)

-stage 4- Identifying the congruous definite localized resources:

- (21)Fg-*
 (21)Fg-*:
 (21)Fg1*:
 (21)Fg2*:
- Clay (dried, fired) for brickwork in external walls
 Dried clay, adobe
Fired clay, ceramics

-stage 5- Identifying the congruous specific localized resources:

- (21)Fg2.--
 (21)Fg2.--:
- Fired clay for brickwork in external walls

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- (21)Fg2.0010: Common bricks 26x13x6 (q30/1.000)
 (21)Fg2.0011: Common bricks 28x14x5 (q35/1.000)
 (21)Fg2.0012: *Facing bricks*
 (21)Fg2.0020: Hollow bricks 28x14x5 (q12/1.000)

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-stage 6- Identifying the compatible works:

- (21)Fg2.0012
 (21)Fg2.0012: Facing bricks for brickwork in external walls:

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- (21)Fz-.0846: Cavity external wall
 external facing brickwork, half a brick thick
 hollow bricks (three holes) internal brickwork, standing
 brick thick

Resources

see (21)Fz-.0690+(21)Fz-.0722

- (21)Fz-.0847: Cavity external wall
 external facing brickwork, half a brick thick
 hollow bricks internal brickwork, standing brick thick

Resources

see (21)Fz-.0690+(21)Fz-.0750

- (21)Fz-.0848: Cavity external wall
 external facing brickwork, half a brick thick
 hollow bricks (six holes) internal brickwork, standing brick
 thick

Resources

see (21)Fz-.0690+(21)Fz-.0682

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-stage 7- Identifying the accessory resources:

- (21)Fz-.0690
 (21)Fz-.0690: *Facing bricks brickwork, half a brick thick*
Resources
 **g2.0012: *Facing bricks*

**q4.0000 Mortars
 **c3.0001 Bricklayer
 **c5.0001 Labourer
 **b8.0000 Manual and individual tools

**q4.0000

**q4.0000: Mortars

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**q4.0012: Cement sand mortar (kg400/mc)
 **q4.0013: Cement sand mortar (kg600/mc)
 **q4.0020: Cement lime sand mortar (mc0,35/kg100/mc0,90)
 **q4.0021: Lime gypsum mortar (mc0,90/kg100)
 **q4.0030: Lime "pozzolana" mortar

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(21)Fz-.0750

(21)Fz-.0750: *Hollow bricks (four holes) brickwork , standing brick thick*
Resources

**g2.0021 Hollow bricks (four holes) 24x12x8 (q14/1.000)
 **q4.0000 Mortars
 **c3.0001 Bricklayer
 **c5.0001 Labourer
 **b8.0000 Manual and individual tools

**q4.0000

**q4.0000: Mortars

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**q4.0004: Lime sand mortar (2:5)
 **q4.0005: Lime sand mortar (1:2)
 **q4.0006: Hydrated lime sand mortar (kg250/mc)
 **q4.0007: Hydraulic lime sand mortar (kg300/mc)
 **q4.0008: Hydraulic lime sand mortar (kg400/mc)

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-stage 8- Identifying the item of the singled out element:

(21)Fz5.0847: Cavity external wall:
 external facing brickwork , half a brick thick, with cement
 lime sand mortar (mc0,35/kg100/mc0,90)
 hollow bricks internal brickwork, standing brick thick, with
 hydrated lime sand mortar (kg250/mc)

Resources

**g2.0012: Facing bricks
 **g2.0021 Hollow bricks (four holes) 24x12x8 (q14/1.000)
 **q4.0020: Cement lime sand mortar (mc0,35/kg100/mc0,90)
 **q4.0006: Hydrated lime sand mortar (kg250/mc)
 **c3.0001: Bricklayer
 **c5.0001: Labourer
 **b8.0000: Manual and individual tools

6. The information block

The information block consists of the informative documents which are grouped in files according to their specific characteristic: technical regulations, resource technical sheet, specifications, cost analysis, prices list. As the information is a resource, the identification of the access code to the informative documents files occurs by means of a research in the building resources file (6).

** - *

** -: Generic resources

** a*: Administration

****b*:** Labour
****c*:** Aids
****d*:** Vacant
****e*:** Natural stone
****f*:** Precast with binder
****g*:** Clay (dried, fired)

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****a-***
****a-*:** Administration
****a1*:** Organizing offices projects
****a2*:** Financing, accounting
****a3*:** *Designing, physical planning*
****a4*:** *Cost planning, cost control, tenders contracts*
****a5*:** Production planning, progress control
****a6*:** Buyng, delivery

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****a3.----**
****a3.----:** Designing, physical planning
****a3.0000:** *Regulations*
****a3.0001:** *Technical sheets*
****a3.0002:** *Specifications*

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****a4.----**
****a4.----:** Cost planning, cost control
****a4.0000:** *Costs analysis*
****a4.0001:** *Prices list*

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7. The information finding

The access code to a file allows to find the information contained in it; in the file the information is identified by the same codes which identify the subjects as they are defined in the different stages of the research path: as to its traditional form, the information is articulated and reset in order to link a determinate subject to the only information pertaining to it and according to its definition level. Considering the subjects identified in the reseach path, as exemplified above, some relevant informations, for example brickwork and brick subjects, are found selectively in the files as follows:

****a3.0000**
****a3.0000:** Regulations

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(21)*:** External walls - tit.III law 30.4.76 n°373 (informations about regulations on energy use control in buildings)

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****a3.0001**
****a3.0001:** Technical sheets

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****g2.0012:** Facing bricks - technical sheet (specific informations supplied by the producers)
****g2.0021:** Hollow bricks (four holes) 24x18x8 (q14:1.000) - technical sheets(informations as ab.)

****a3.0002**
****a3.0002:** Specifications (7)

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***F**:** Brickwork, blockwork - art. 75.0 (general informations about brickwork, blockwork of all kinds)

- (21)Fz-0600: Brickwork in external walls - art. 75.4.0/75.5.3 (general informations about brickwork)
- (21)Fz-0690: Facing brickwork, half a brick thick, in external wall - artt. 75.4.1/75.5.0 (specific informations about the subject)
- (21)Fz-0750: Hollow bricks (four holes) brickwork, standing brick thick, in external wall - art. 75.5.0 (informations as ab.)
- (21)Fz5.0487: Cavity external wall, etc. - art. 75.4.2 (informations as ab.)
- **g* : Clay (dried, fired) - artt. 39.0/40.0 (general informations about the subject)
- **g2* : Fired clay, ceramics - art. 39.0 (informations as ab.)
- *Fg2* : Fired clay for brickwork - artt. 39.1 (informations as ab.)
- **g2.0000: Common bricks - art. 39.1.1 (detailed informations about the subject, UNI scedules, categories, types, dimensions)
- **g2.0020: Hollow bricks - art. 39.1.4 (informations as ab.)
-
- **a4.0000
- **a4.0000: Costs analysis (8)
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- (21)Fz-0690: Facing brickwork, half a brick thick, in external wall - art. 9.11 (informations about quality and quantity of necessary resources to implement the subject, u.m., un cost, tot.cost)
- (21)Fz-0750: Hollow bricks (four holes) brickwork, standing brick thick, in external wall - art. 9.9 (informations as ab.)
- (21)Fz5.0487: Cavity external wall etc. - art. 9.12.3 (informations as ab.)
- **q4.0006: Hydrated lime sand mortar (kg250/mc) - art. 6.6.1 (informations as ab.)
- **q4.0020: Cement lime sand mortar (mc0,35/kg100/mc0,90) - art. 6.7 (informations as ab.)
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- **a4.0001
- **a4.0001: Prices list (9)
-
- **g2.0012: Facing bricks - art. 2.3.4 (informaztons about u. price of the subject)
- **g2.0021: Hollow bricks (four holes) 24x12x8 (q14/1.000) - art. 2.5.2 (informazioni as ab.)
- **q4.0006: Hydrated lime sand mortar (kg250/mc) - art. 5.3.1.(informations as ab.)
- **q4.0020: Cement lime sand mortar (mc0,35/kg100/mc0,90) - art. 5.2.4 (informations.as ab.)
- (21)Fz-0690: Facing brickwork, half a brick thick, in external wall - art. 9.5.4 (informations as ab.)
- (21)Fz-0750: Hollow bricks (four holes) brickwork , standing brick thick in external wall - art. 9.6.3 (informations as ab.)
- (21)Fz5.0487: Cavity external wall etc. - art. 9.14.4 (informations as ab.)
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8. Conclusions

The related exemplifications rise from an experimentation carried out in order to verify the link efficiency for the research path progress; a Macintosh SE Word Processor was utilized on a limited number of subjects. The data bank structure implementation to a higher level is possible through the use of more suited informatic means; obviously that involves a remarkable engagement of economic and human resources. An experimentation on a significant sample of subjects might be included in the

programs and possibilities of a small Organization; an exhaustive interventation on the matter can pertain but to a central Organization.

Notes

- (1)- see: J. NAISBITT, "Megatrends - Ten New Direction in Transforming our Lives", warner Brooks, 1982.
- (2)- see: G. VETRIANI, M.C. MAROLDA, "A Selection Procedure for an 'Aimed' access to information", Atti del 4th European Conference eCAADe, 1986.
- (3)- see: G. VETRIANI, M.C. MAROLDA, "Piano di Classificazione PC/SfB", ITEC, 1983.
- (4)- see: B. BINDSLEV, "Classification and Coding of Information", Atti del Seminario Tecniche e Strumenti per il Project Management, 1988.
- (5)- see: B. BINDSLEV, "Classification Tables with comments (Tab.3)", as ab.
- (6)- Characters differences show: request, alternative, *option*.
- (7)- see: L. LENTINI, "Capitolato speciale di appalto per lavori edilizi", Pantano, 1984.
- (8)- see: SERVIZIO TECNICO CENTRALE MIN. LL.PP., "Analisi dei prezzi per la progettazione e revisione", DEI, 1981.
- (9)- see: BOLLETTINO NAZIONALE MATERIALI E OPERE, "Tariffa generale unificata dei prezzi", DEI, 1984.



