



## **Classification Standards**

### **Introduction**

The subject of international standardization is emerging as one of the hot topics of the 90's, with work currently being done at an international level in ISO (International Standards Organization) and ICIS (International Construction Information Society). ICIS is a private sector association of specifications and costing organizations (15 in total) from 13 countries. ICIS is engaged in researching better ways of relating construction information.

Some of the logical questions most of us might ask ourselves is "That is interesting research, but what is in it for us? What REAL benefits should we expect to see? ... next year? ... next month?" This topic is explored in this article - the of ICIS member efforts, directly relate to the software development which will be required to implement certain standards into products that you and I can use everyday. The result is greatly improved efficiency and a better set of construction documents.

### **History**

Most of us work in the traditional "residential / commercial / industrial / civil" design sectors of the construction industry. In addition, firms have tended to specialize in smaller portions of those industries (such as architectural design, mechanical design, design-build contractor, roofing subcontractor, louver manufacturer, and a multitude of others). Each of those entities have developed their own means of filing and tracking information regarding a particular project, usually independent from outside firms.

Our work is also traditionally concentrated in a very narrow portion of a project life cycle. Contractors generally focus on the construction phase; designers may focus on both design and construction phases (in differing capacities); manufacturer's focus only on the product supply phase (with luck, they may also be involved with the design, construction and maintenance phases). The point is that all of these entities, to be effective, have a need for the total information base for a project, outside of their traditional phases of involvement.

With the advent of a classification system developed by Construction Specifications Institute (CSI) and Construction Specifications Canada (CSC) over 30 years ago, the various sectors were able to find information by filing certain subjects in a common, "standard" location. Today, we have two common classifying approaches known as MasterFormat and UniFormat. Even those industry people who do not know the term MasterFormat, recognize our "sixteen division format" because it has become a defacto North American standard - UniFormat enjoys similar status in the cost plan and costing industry.

We in North America are fortunate that our CSC and CSI forefathers (many of them are still around) had the foresight to combine efforts to produce a truly "North American" standard by producing and adopting MasterFormat in the 1970's. European and other world countries operate using their own standards (in some instances, without standards). Other

countries recently recognized the need to develop common standards with the input of as many "cooperating" countries as possible.

With the proliferation of computer technology, our industry is beginning to realize that we can exploit computers to help us improve the construction information process to reduce errors, improve communications between all parties involved in a project, and improve project documentation efficiency. One of the side benefits that we now enjoy as a result of computer and communications technologies is that we can now communicate more efficiently with anyone in the world, regardless of physical location. This is spawning an increase in business outside our traditional "territory".

Today, it is both the North American's need to develop a classification system which ties together all aspects of a construction project from the twinkle in an owner's eye to demolition, from the raw materials manufacturers to sales agents, contractors, consultants, and owners. Simultaneously, other world countries have recognized this need for a better classification system which all parties involved in a project can use. ICIS is the culmination of the desires of 15 countries (currently) to develop a common classification system, with the commitment to move towards and ultimately adopt the results of ICIS efforts in their respective countries.

### **Future Information Infrastructure**

In the future, all bits of information (products, decisions or documents) relating to a project could be inter-connected. As we will see momentarily, from an electronic point of view the axiom "say it once", which is preached by both CSC's and CSI's Manual of Practice, is most important.

In the same context that errors and omissions are reduced in specification sections by "saying it once", errors in electronic data management (as well as duplication) are also reduced. Perhaps the best analogy to illustrate this point is to use a practical example. Let's analyze an exterior wall louver.

If we assign an exterior louver a specific place in a classification system. We can electronically link all other information to the louver (both product and project), such as:

- composition qualities: material, blade design, finish;
- functional requirements: free area, efficiency, blade rigidity;
- quantities and locations: each linked to specific objects indicated on drawings;
- standards: 6063-T5 aluminum, AMCA (Air Movement and Control Association) performance ratings;
- related components: birdscreen, control damper, blank-off panels;
- related systems: curtainwall system;
- cost criteria: budget cost, unit cost, quantity cost;
- referencing documents: drawings, specification section, addenda, sheet metal subcontract, site meeting minutes, change orders, progress payments;
- related parties: mechanical consultant, general contractor, mechanical contractor, sheet metal sub-contractor;

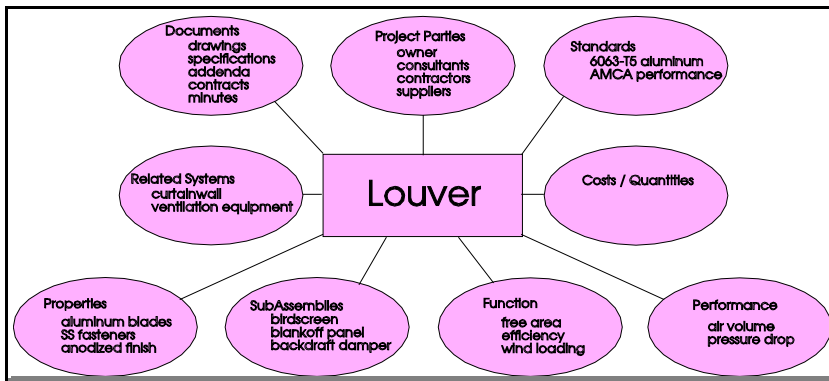


Figure 1: This diagram illustrates the various types of related information which can be electronically linked to a louver on a project. As a result of these links, any queries from related information will automatically associated to the louver.

air volume each, shown on drawing M-1, specified in Section 15850, changed in Addendum 4, discussed in a Site Meeting on 96/12/25, and paid for with Progress Payment No. 130).

Because all of the information would be stored in one place, electronically, the process could also work in reverse. For example, looking up Addendum 4 would reveal size changes to the louvers. Again, all related louver information could be accessed by "drilling" down to as much detail as desired.

The power of a classification structure of this type is not limited to merely linking related bits of information. In the same way that "say it once" allows a specifier to change a specification section and affect an entire project, a single change to an electronic database automatically changes (or highlights changes for human review) affected documents, products, or people.

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To manage the plethora of information in a project, we can create more useful "groups" of information. Using our louver example, a louver object would consist of sub-groups (or single items) of information such as material, finish, etc. A louver

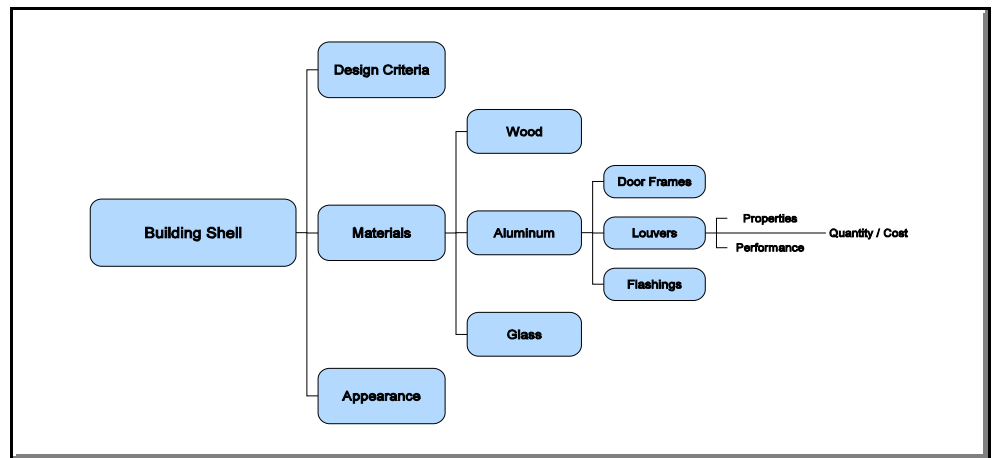


Figure 3: An owner or consultant may typically design or query information about a louver by first going through higher level objects. This figure shows an example query where a consultant may view or query the project database by first looking at the building shell. To reach the louver, the consultant may choose the "materials" attribute, which will lead through "aluminum", then to "louvers". Remember that this heirarchy is not necessarily exclusive (the same louver could be reached from either the "structural" or "aesthetic" paths).

Because every one of the criteria presented above are also characteristics or factors in themselves, it is easy to link the related individual pieces of information electronically. The reason why people access information is different; consultants may wish to access louver information only as it affects a specific change order, and contractors may be interested only in pricing and installation requirements. Because all of the information is linked, the same classification system will work for both.

With this structure, someone could look up "louver" and receive all of the above information (eg. there are four aluminum louvers of A x B size, able to handle 500 cfm

could itself be a subgroup to a higher group (such as an exterior wall system).

## How is a Classification Implemented?

Anyone proficient at database programming could probably design a comprehensive software system as described above. In fact, many companies have already successfully developed portions of those visions. The problem is that all systems today use proprietary electronic classification systems to build the information infrastructure. What is missing is a classification system which is globally accepted, within which information can be filed in a standard location.

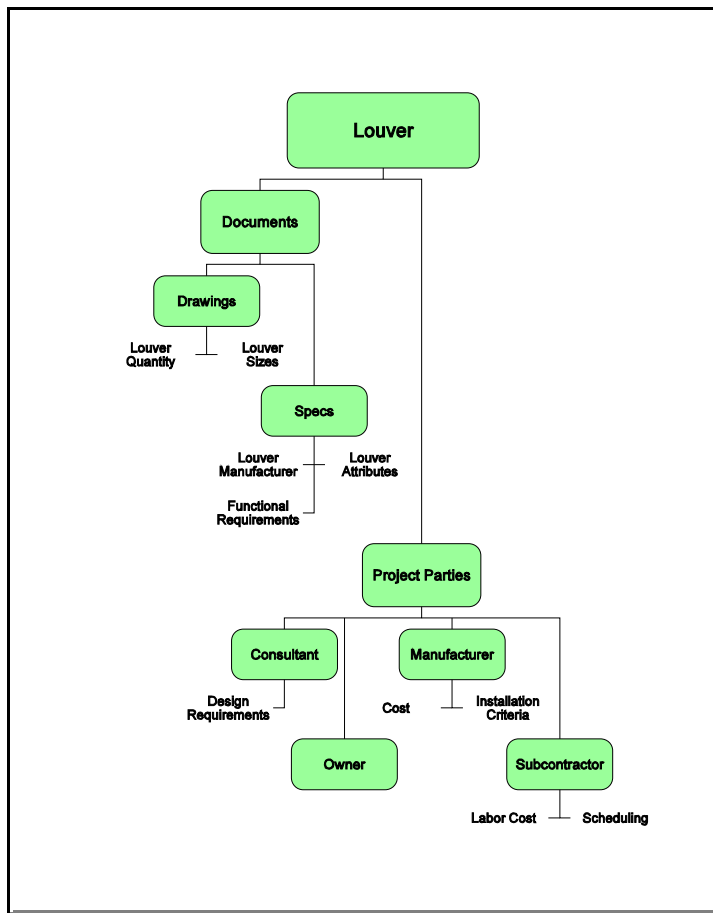
The electric power infrastructure is a very good example of a standard classification system. When we purchase a toaster in North America, we KNOW it will fit our power outlet and the components will be electrically compatible with the power supply. In this manner, anyone can compete in the toaster market because the basic operational criteria is the same for everybody.

Our toaster analogy also serves as a classic example of why we need to work together with other world countries to establish a truly global classification standard. Just try to plug a North American toaster into a European outlet. Not only is the plug not physically capable of being inserted into an outlet, but power specifications are incompatible (hence the need for special adapters and a transformer). If we do not work together with our international colleagues, we will find ourselves incompatible with the rest of the world.

In a similar way that MasterFormat attempts to provide a classification table for each product or system in a building, a more global classification is required to provide the broader infrastructure described above. This newer classification system must be multi-dimensional, encompassing the strengths of MasterFormat (it may even allow the use of MasterFormat for classification of product materials and systems), combined with classifications to allow tracking of other types of project information.

To illustrate the need for a higher classification system, let's use an example of an exterior louver. MasterFormat 1995 classifies louvers in two places: Section 10720 and Section 15850. This phenomenon exists as a result of sub-consultant overlap (usually architectural and mechanical) during the design stage, as well as sub-trade overlap during the construction stage.

With a more global classification system, all of the reasons for wanting to separate louvers into two categories could be satisfied by limiting louver



**Figure 4:** This chart indicates the various sources of information a typical contractor would wish to extract about a louver. It indicates that the physical louver information is obtained from project documents (sizes, attributes, etc) and other non-physical information (such as design requirements or costs) from other project parties. With a standard classification system to store information, all of the information related to the louver would be quickly accessed electronically by the contractor.

information to a single location and referencing that location from any number of ways. Architectural designers may reference louver information for louvers within their scope of work, and mechanical consultants may reference the same louver for their scope of work. The bottom line; ONE location, MANY references or links.

Even with an object as simple as a louver, the factors affecting any decision are spread over many parties (owner, prime consultant, mechanical consultant, general contractor, mechanical contractor, sheet metal contractor, supplier or manufacturer). Even with so many parties involved (and decisions made), a global classification system could allow an object to possess electronic links to every piece of related objects (other products or documentation).

### **Yes, But What's In It For Me?**

**For Everyone:** a global (international) classification system will allow every construction-related business to sell products or services to any country in the world, and blend seamlessly into whatever software infrastructure is used in that country.

**For The Designer:** Designers will be able to communicate more efficiently with all other parties involved in a project. Global changes in products and/or system design will be easier. Greater project knowledge will make for more informed design decisions than ever before. With less time spent on management and coordination, designers can reduce overhead or price themselves more competitively.

**For The Contractor:** Fewer errors and omissions in bid documents should prevent misunderstandings, as well as necessitate fewer on-site coordination problems. Sub-contractors should have little or no disputes over jurisdiction (unless they choose to combine trades into a single price - another subject for another day), and will be more enlightened to the ramifications of contemplated project changes than ever before.

**For Manufacturing/Sales:** Domestically, it will be easier to have products accepted when they are designed to fit into a consultant's electronic library (similar to the way MasterFormat numbers are now used in paper libraries). Internationally, new markets will automatically open themselves up to North American products since the classification system will be identical -- in effect, enabling competition with local manufacturers on a level playing field (notwithstanding physical delivery or language obstacles).

### **Conclusions**

We have just barely scratched the surface of this subject of classification systems, and its impact on our industry as well as the electronic implications. The main point of this article is our vision of our future is to strive for a highly efficient information management system for the entire industry. This can only be done with the assistance of computer software. In order for computers to manage the enormous variety of information types involved in a construction project, it needs a standard classification system in which to file those types and truly function globally.

Once this goal is obtained, communicating and working with our international colleagues in business will be as easy as A-B-C.

**David Watson, CET, CSC, CSI**, *President of Digicon Information Inc., a construction software development and construction information marketing firm.*

**Digicon Information Inc.**

*Camrose*

4514 - 47 Street  
Camrose Alberta Canada T4V 1J1  
Telephone: 403-672-8525  
Toll-Free (Western Canada): 800-610-SPEC  
Facsimile: 403-672-9882  
E-mail: [w2@digicon.ab.ca](mailto:w2@digicon.ab.ca)

*Calgary*

125 Covington Bay, N.E.  
Calgary Alberta Canada T3K 4A9  
Telephone: 1-403-226-3272  
Facsimile: 1-403-226-3272  
E-mail: [david@digicon.ab.ca](mailto:david@digicon.ab.ca)

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