culturempresa
Culture e impresa - On-line journal - n. 9, September 2010
Fondazione Ansaldo Genova
Centro per la cultura d'impresa Milano
Supported by
International Council on Archives - Section Business and Labour

The Role of Archives as a Starting Point for Modern Design

by Francesco Rosa, Edoardo Rovida

1. Introduction

Scientific and technical assets [such as records, objects or drawings] can be used as tools for interpreting cultural heritage and comprise a key factor to understanding technical and historical evolution, thus providing a stimulus for current research and planning. Ideas have often been conceived, sketched out and then abandoned for different reasons: the lack of suitable materials or technologies, or else opportunities or organizational structures to produce them were not available at that time. Such ideas could be critically re-examined now [in the light of their historical evolution] thereby providing valuable insights to modern planning and design. In other words, the history of technology could be employed heuristically with the aim of developing innovative solutions for planning and design in our current context.

The use of technical and scientific assets, however, entails a few problems:

- objects and records are often preserved in places distant from each other and many of these sources are not available [for consultation];
- objects and records are usually quite delicate and perishable.
- Both of these problems can be solved with the help of IT.

2. The Historical Evolution of Constructive Solutions: A Methodology

In developing a project, it could be useful to have access to the historical evolution of a constructive solution that is [currently?]being designed; by 'historical evolution', we mean a chronologically ordered sequence of all technically significant developments of a design project, including critical comments. From our personal experience with technical drawing archives, especially in the automotive field, we have seen that it is possible to map out the guidelines for a general method to re-trace the historical evolution of a given constructive solution. Generally, it is based on the following steps:

a) during the planning phase, it is important to delineate the research field according to one or more selection criteria: the type of solution, the country where was built, a period of time;

b) identify institutions, museums, libraries, public or private archives, business archives where material can be found. This step is as important as the correct choice of all significant sources;

c) planning a classification schedule must include all the elements to ensure its proper management, along with schedules of other constructive solutions, in a system of integrated databases. The schedule must include all the information describing the features of a period

drawing: author, date, number and title of the drawing, object represented, type and method of representation, scale, dimensions, signature, technique, instruments and support as well as presence of color. Moreover, it is important to include mention of the condition of the drawing and, in particular: of its state of preservation, completeness, legibility, type of damage, any evidence of restoration. It should also be possible to identify the company that executed the drawing, any acquisition of the drawing by an institution, and finally, its pressmark;

d) the software to manage such an extensively structured classification system should allow the researcher to:

- consult the data sequentially as a schedule, list, catalogue or image;
- order the data according to the content of one or more fields (ascending, descending or personalized order, according to a list of values defined by the user);
- carry out research of any kind placing the data into any field;
- display the images in a catalogue from which it is possible to make selections and to create sub-catalogues;
- display a reduced image of the technical drawing within the schedule;
- display the technical drawing full screen starting from both the catalogue and the schedule;
- print the schedule or parts of it;
- print lists created according to the research or the chosen organization of the data;
- print the image of the technical drawing with the most important data;
- change, using a password, the existing schedules and add new schedules;
- import images into the new schedules;
- export the classification data towards other databases or programs;
- publish the database, completely or partially, on the Net or on local networks.

3. Archives of Constructive Solutions for Automotive Suspension

The method described above was applied to technical drawings for car suspensions generating an archives of around 500 cases, from the advent of motoring up to present days.
We decided to set up a database through a cross-platform software created to manage a data classification and image display system with powerful research functions. We also planned modules to load and consult data and to display images.

These modules make it possible to load, research and display:

• general data regarding the suspension (year of design and construction, company producer, general data of the vehicle, general data of the suspension);

• formal data regarding the original and the reproduction of the catalogued drawing (orthogonal projections, axonometric projections, exploded axonometric, picture or drawing);

• specific data describing the constructive solution (linkage parts, coil or spring parts, shock absorbers, and so on);

• data on the state of preservation of the drawing;

• images regarding the constructive solutions, both reduced within the schedule and in the catalogue, and scaled up.

The modules for the loading and consultation of the data have been done in such a way that they can be connected to one another, making it easy to load new information and to display it according to various criteria of interest and levels of analysis.

The database can be updated by adding and filling in new schedules about other suspensions and loading images of them.

A specially provided module for research was created; the research form as all the fields used to describe the various constructive solutions. Thus it is possible to use one or more criteria, linked if desired, in order to obtain the desired selection within the archived material. It is then possible to choose to display the result as a list or as a catalogue with small images and, from this selection, make new selections, narrowing down the search to get the desired result (creation of a sub-catalogue).

Another module allows ordering the schedules displayed according to the selected criteria (number of schedule, year, brand, model, constructive solution, position, and so on).

The completion of the database required a final verification to check the congruency and representativeness of the acquired material. Chosen images are drawings, axonometric and orthogonal projections, illustrations and pictures. They were acquired directly from the original or from a reproduction using, for the most part, the digital method. Given the variety of styles and dimensions of the collected material, it was necessary to convert the images into the same format from both a graphic (elimination of colors and half-shades, sizing) and an IT point of view, so that they could be compared.

For images, damaged original drawings were restored through a digital process.

The software was tested on three samples of users: students, professional planners and automotive historians. The result of the test on the use of the software entailed the adaptation – elaboration in some cases, simplification in others – of the schedule and the module and this allowed a final organization of the program structure (creation of new entries and new links). After that, we planned and created a new graphic interface, which integrated the test results, into the classification program. Then, we produced a beta version and subjected it to a targeted use by a limited number of students, professionals and historians who were selected to examine the program in greater depth. Further simplification of the database structure made it easier to use. At last, we had the final version.

4. The Use of Technical Archives in Engineering Education

We have frequently used this archives in our teaching activity. A interesting exercise for our students is to find innovative solutions using a historical constructive solution as a starting point, and applying an abstraction criterion. The core of reasoning consists of identifying the operating principle of a historical solution and then, through a process of abstraction, applying it to current construction practice

5. Conclusions

We believe that our research goals have been fully achieved. This consideration is based on verification of the soundness of the theoretical model both at the stage of defining the method and at that of validating the IT archives. The most relevant elements of this experience are the definition of a model that is transferable to other scientific fields, as well as the influence that examining the historical evolution of a constructive solution—in this case, the study of automotive suspension systems—could have on modern planning and design in several industrial fields. This methodology will help future researchers to study various areas of technology history and to make this invaluable patrimony available to future planners, teachers and historians. And this is what we hope will happen.