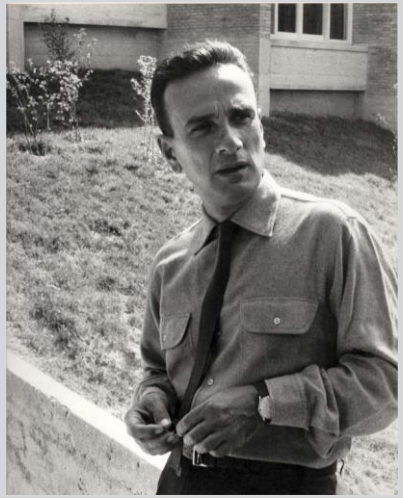
Built between 1962 and 1983, the Urbino University Colleges (“Collegi Universitari di Urbino”) are one of the most famous and significant works of Giancarlo De Carlo, Royal Gold Medalist for Architecture in 1993.

The complex is born in a completely natural environment and is not visible from the historic city of Urbino, where Giancarlo De Carlo worked for over thirty years, signing two master plans (1958-64 and 1994) and some emblematic interventions in and around the historical center (the market square “Mercatale” and “la Data”, the Faculties of Law and Education “Magistero”, the philosopher Sichirollo’s villa Ca’ Romanino, the Faculty of Economics, …), nonetheless the link between the colleges and the city is very strong.

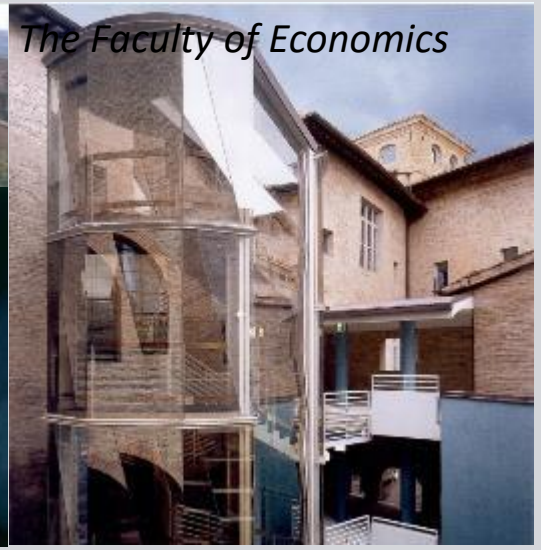


The Rampa, Data and Mercatale market square

Magistero

Ca Romanino

The Faculty of Economics



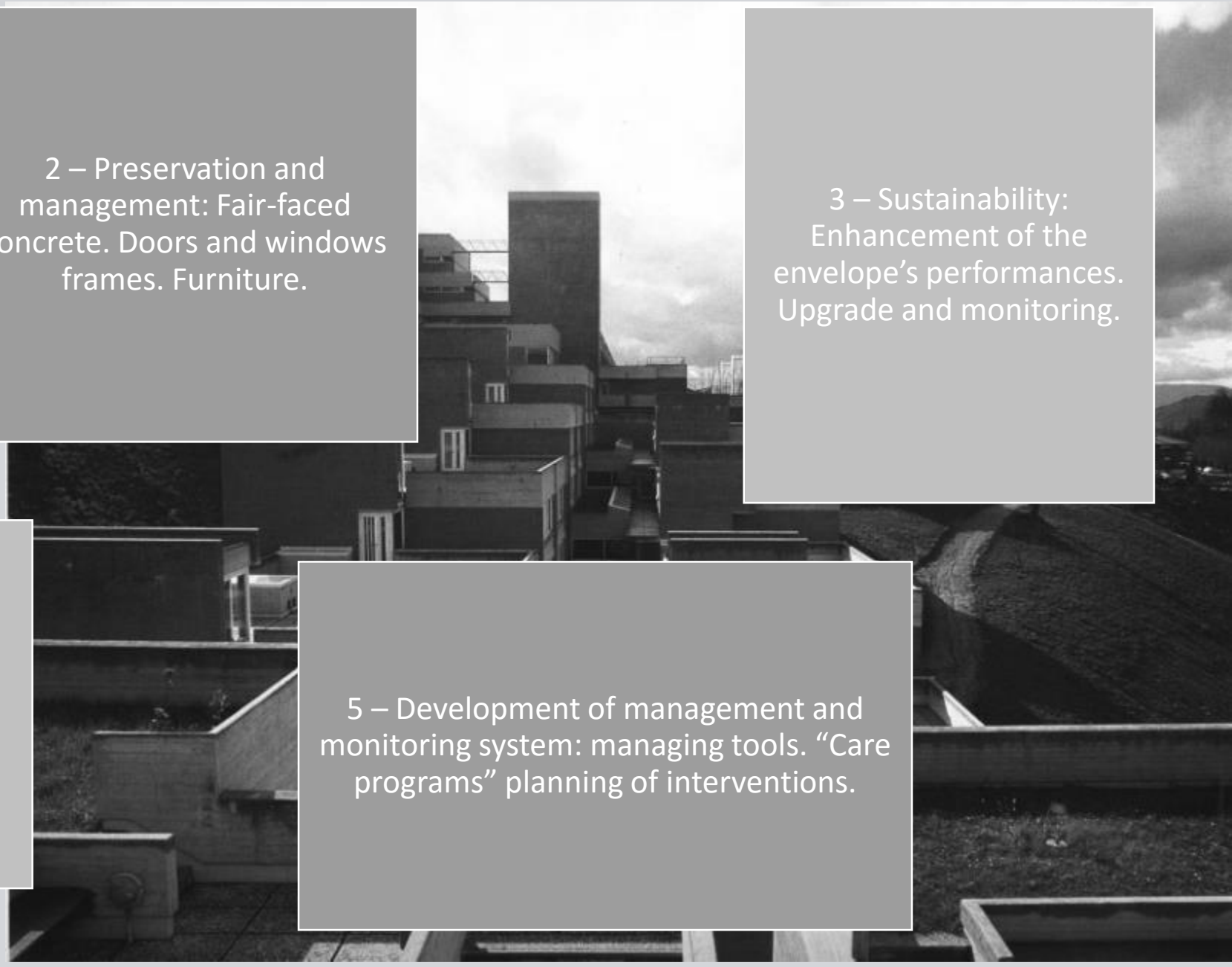
My effort - De Carlo writes - has been to build a university settlement indubitably contemporary but run by the echoes of Urbino’s history: to the extent that the citizen could consider it another part of the town they already knew and feel it so familiar to want to use it on a daily basis, even though it was inhabited by students rather than by fellow residents. In other words, the intention was to establish a permanent exchange between the historic city and the Collegi city. (Buncuga, F., Conversazioni con Giancarlo De Carlo. Architettura e libertà, Eleuthera, Milano, 2000, p.132)

Tematic Areas

1 – Understanding the Collegi, Gathering and organizing studies and data. (History and significance of the building, Data collection, organization and sharing. Identification and description, Improvement and renovation.

2 – Preservation and management: Fair-faced concrete. Doors and windows frames. Furniture.

3 – Sustainability: Enhancement of the envelope’s performances. Upgrade and monitoring.



4 – Managing Use and Change: Current uses; new uses layouts.

5 – Development of management and monitoring system: managing tools. “Care programs” planning of interventions.

The Getty Foundation “Keeping it modern” - Conserving Modern Heritage, **Urbino’s University Colleges**

The Team

MTA Associati - Giancarlo De Carlo Associati

- Referent: Arch. Monica Mazzolani, Arch. Antonio Troisi, Arch. Andrea Chiarolini, Angela Mioni.
- ***Task: Coordination of project activities, Understanding the Collegi, historical research assessment and articulation of cultural signifier, improvements and renovations; conservation of material and architectural element, sustainability.***

Politecnico di Milano - ABC Department of Architecture, Built environment and Construction engineering - Research group on the of Preventive and Planned Conservation of Built Cultural Heritage

- Referent: prof. Stefano Della Torre, Arch. Ph.D. M.Paola Borgarino, Arch. DS. Margherita Pedroni, Arch. DS. Cristina Ciovati.
- ***Tasks: analysis of the building, survey, identification and description, mapping, identification of the technical solutions and development of the guidelines, maintenance/ monitoring schedules.***

Technical department.University of Urbino Carlo Bo

- Referent:, Ing. Fabio Fraternale, Geom. Luiselle Spadoni
- Task: Schedule Furniture, improvements and renovations, preparation Workshop 1, pilots sites, sustainability guidelines, drafting of new uses layout, upgrades and new uses Guidelines.

Institute for the Conservation and Promotion of Cultural Heritage (ICVBC) of the CNR - National Research Council.

- Referent: Dott. Antonio Sansonetti
- Task: Conservation of materials and architectural elements.

Preservation and restauration of cultural heritage. Conservazione e restauro dei beni culturali University of Urbino Carlo Bo

- Referent: Prof. Laura Baratin
- Task: Furniture

ERSU Ente regionale per il diritto allo stdio Università di Urbino - Regional agency for study entitlement University of Urbino. Team project

- Referent: Ing. Gabriele Giglioni
- Task: Improvements and renovations, technical equipment, maintenance and renovations, compliance with the regulation and standards, redevelopment project, management and operational costs, pilot sites residential cell, sustainability guidelines.

Department of Economics , Society , Politics - DESP University of Urbino Carlo Bo

- Referents: prof. Guido Maggioni (coordinator), dott. Eduardo Barberis, dott. Elisa Lello, Nico Bazzoli, dott. Fabrizio Pappalardo, dott. Giovanni Torrisi .
- Task: Current uses’ detection and mapping

CECH Laboratory

- Referent: Prof: Cesare Maria Joppolo, Arch. Davide Del Curto, Arch. Andrea Luciani, Arch. Luca P. Valisi.
- Task: Sustainability

Main Issues , Materials and architectural features Conservation

The exposed concrete surfaces are one of the characteristic features, but at the same time one of the most critical (carbonation, corrosion of reinforcing bars, expulsion of concrete cover).
Description / identification and quantification of phenomena: there are many different situations, which depend on:

- **Morphology of the elements** (thickness, in some cases less than 10 cm);
- **Material and installation** (contrary to older cement - are connected those of the best preserved and have a lower depth of carbonation;

The surfaces most affected are those of the Trident, where the material is poor and where they were used welded networks are almost superficial as reinforcing bars);

- **Presence of surface working** (in some instances the concrete casts were washed after the formwork to put in view of the aggregates)
- **Presence of mixtures with different color** characteristics and texture
- **Processing Techniques** (cements are vibrated by hand, then with in homogeneities and recurring gravel nests) and exposure

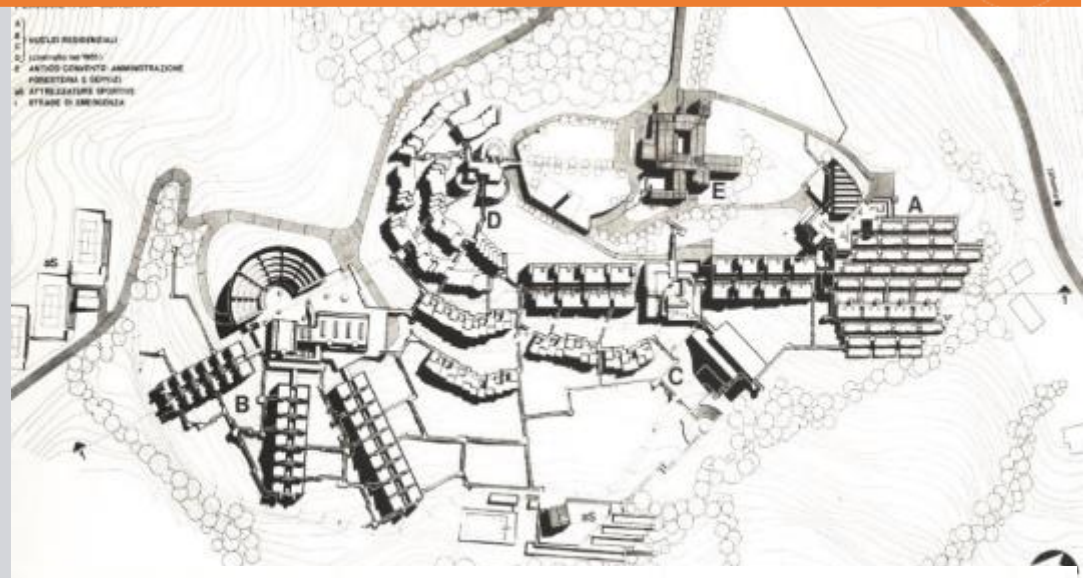
It must also consider the amount of surfaces we are talking about, and the objective
difficulty of doing maintenance (see below, the accessibility problems)

In addition to those already listed special features of the colleges are:

- **Overbalance of common areas**
- Presence of **specialized areas** such as the cafeteria and the library together with communal **spaces without a specific destination** (spaces for free study)
- Fairly balanced ratio between **standardized elements** (prefabricated or repeated details), and those **designed as unique**.

General Issues

- **Up to standard**: the safety regulations require important transformations (partitioning, parapets, removing flammables materials such as coco carpet flooring ....)
- **Insulation:** how to ensure better energy efficiency without special coatings / external insulations?
- **New uses** / compliance of the uses to current needs
- **Extension of the building** and **logistical/ access difficulties** : lack of driveways
- **Absence of an effective protection tool**.
- The necessity to harmonize the activities of two parties since **management and ownership are not the same.**
- The necessity to **act in stages** (while still preserving hospitality for students)
- **Resources** (technical and financial)
- **Absence of adequate cognitive media** (lacking a veritable survey), missing CAD drawings.



Team Relations

Institute for the Conservation and Promotion of Cultural Heritage (ICVBC) of the CNR

Politecnico di Milano - ABC Department of Architecture, Built environment and Construction engineering - Research group on the of Preventive and Planned Conservation of Built Cultural Heritage

Department of Economics , Society , Politics - DESP University of Urbino Carlo Bo

Preservation and restauration of cultural heritage. Conservazione e restauro dei beni culturali University of Urbino Carlo Bo

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CECH Laboratory

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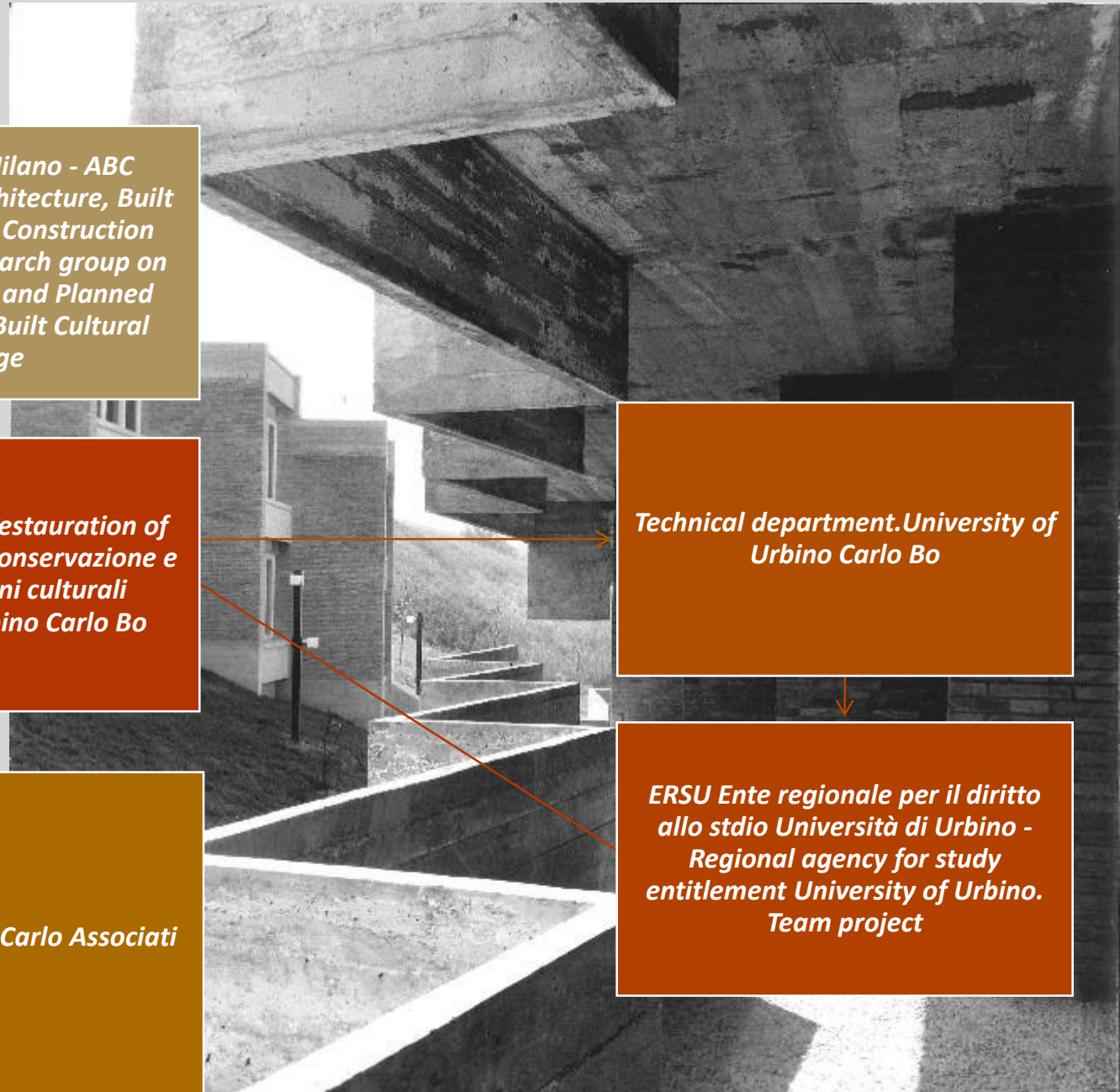
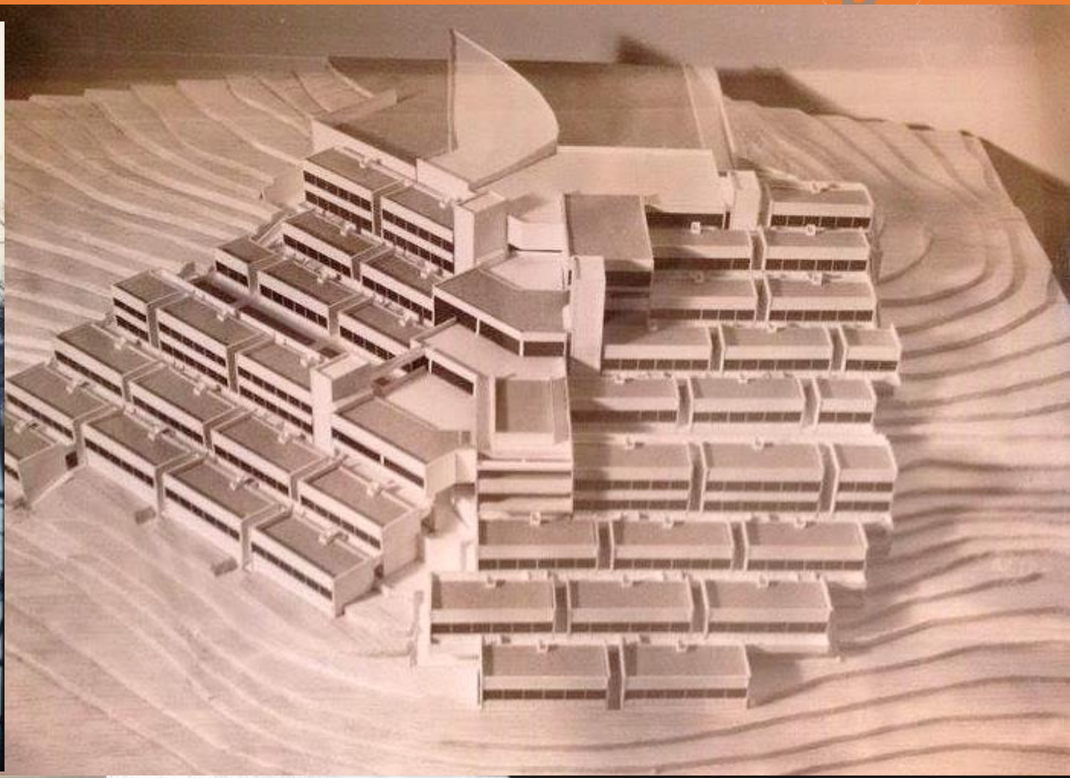
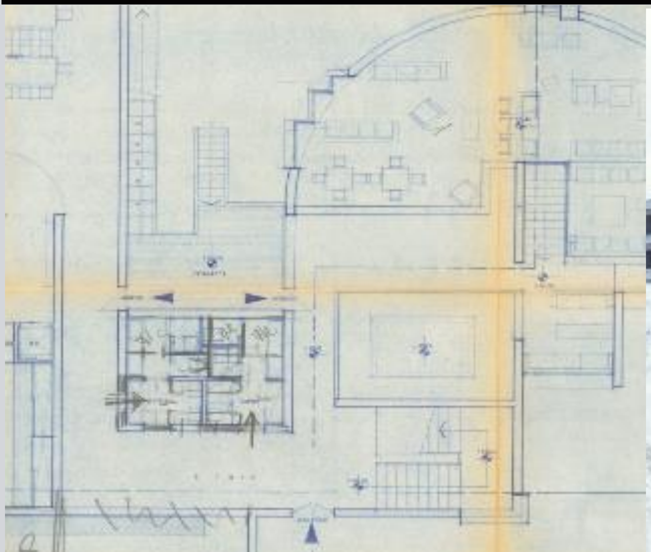
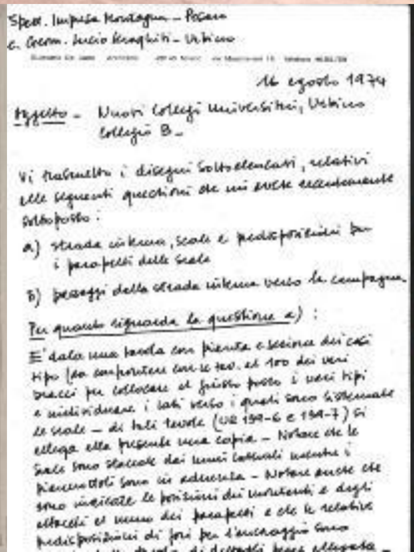


Understanding the Collegi, Gathering and organizing studies and data







Spett. Impresa Montagna – Pesaro
c. Geom. Lucio Braghiti – Urbino

16 agosto 1974

Oggetto – Nuovi Collegi Universitari, Urbino
Collegio B –

Vi trasmetto i disegni sottoelencati, relativi alle seguenti questioni che mi avete recentemente sottoposto:

a) strada interna, scale e predisposizioni per i parapetti delle scale

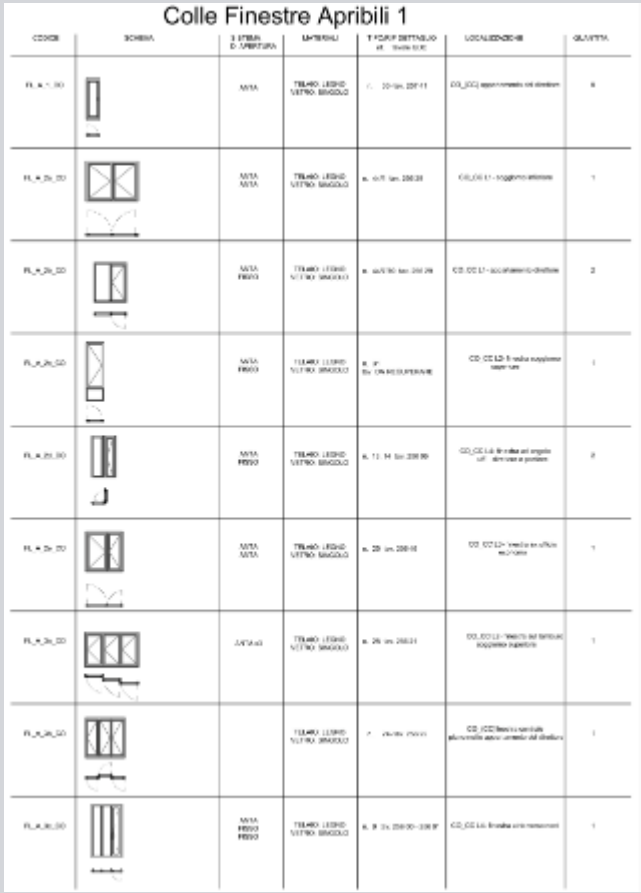
b) passaggi della strada interna verso la campagna.

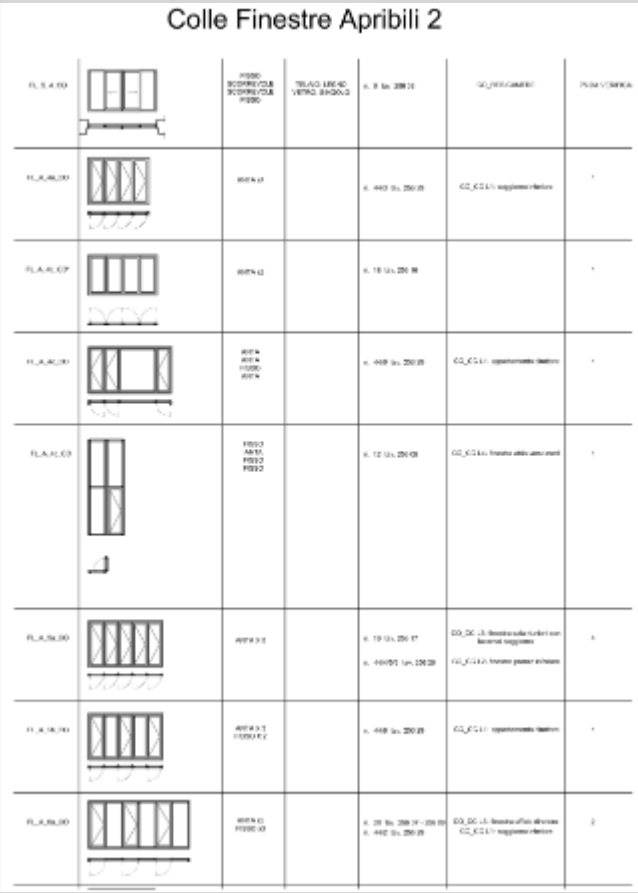
Per quanto riguarda la questione a) :

Window frames
Wooden frames, built to De Carlo’s design, are an element that strongly characterizes the “Collegi”. On this phase a detailed analysis has been made of the typologies, state of conservation and performances of all the existing windows both original and replaced. There are various types (casement windows, sliding, or fixed frames) and size of windows and they are generally in poor condition because of wear and tear and the need for regular repairs, which were underestimated**.**

Crucial issues:

- **Amount of windows,** of different types and often large (4300 items have been cataloged)
- **Wide variations between the first phase of construction** (the Hill almost every element and 'unique, in the other colleges there more standardization)
- **Different conservation status** that depending on exposition, use…
- **Presence of elements already replaced** with different materials





Preservation, Condition Assessment, Analysis

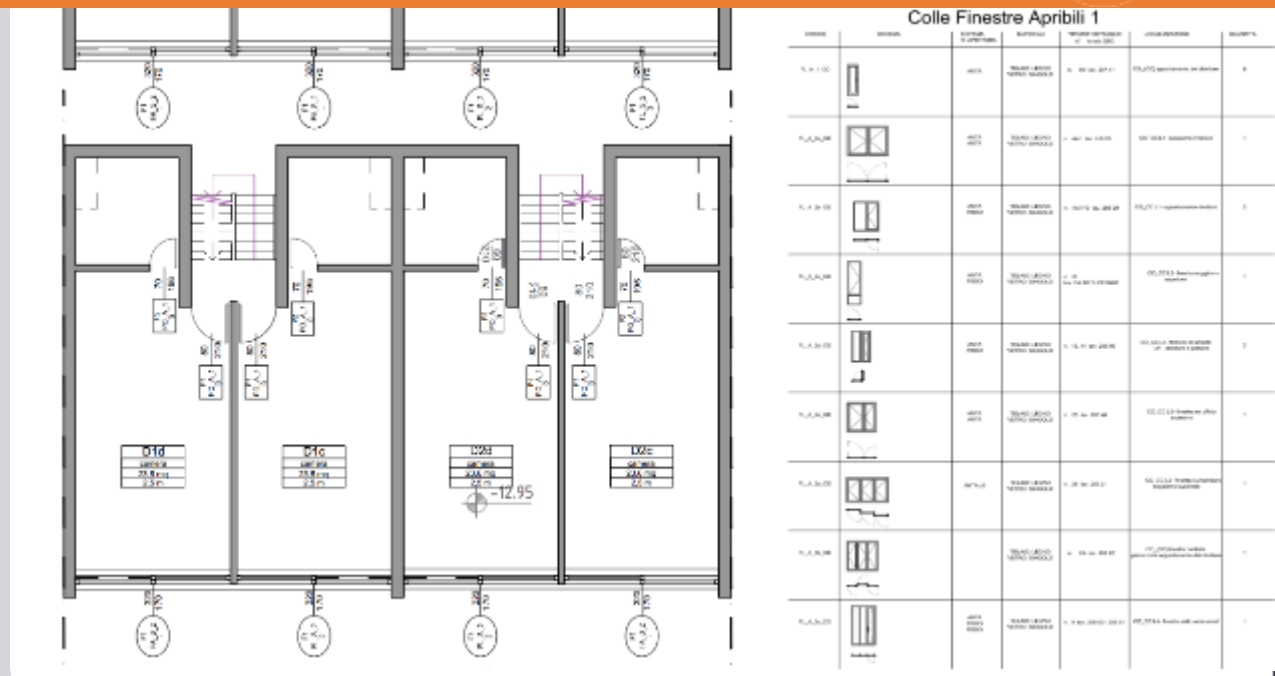
Unique identification of the elements **(each one and 'identified by a code, seen in plants, see figure)**
Construction of a schedule of the types
Identification of the state of conservation of each element (assigned with a synthetic score)

Chosen to proceed to the elements families, giving priority to those that involve higher maintenance problems.

To date is ' tasks are complete on windows is are being concrete are under completion.

4300 frames have been identified: 109 types of windows (44 movable types, 21 windows, 21 fixed, 7 transom, 16 skylights ...) and 62 types of doors.

All this information is entered on the graphs and inhabit the database for maintenance.



Textures and state of Decay

Characterization and classification of the different materials used at Collegi.

- Concrete. Study of binders and aggregates.
- Bricks.
- Composite materials used in flooring.

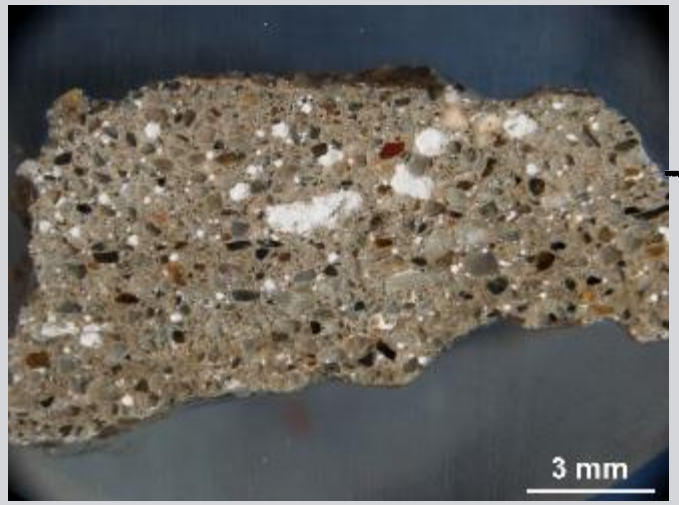
Study of the State of Conservation

- Efflorescence and soluble salts distribution.
- Concretions.
- Old treatments residues.

Analytical Plan adopted to study and classify samples collected.

Elemental and Molecular Composition. Microstructure.

- Optical Stereo-microscopy in Visible and Polarized Light.
- Scanning Electron Microscopy with Energy Dispersive X-Ray Spectrometry (SEM-EDS).
- Mercury Intrusion Porosimetry.
- Ionic Cromatography.
- Fourier Transform Infrared MicroSpectroscopy (μFTIR)
- Raman MicroSpectroscopy (μRaman)



Observation of thin section with polarized light microscopy. Nicols //. Sample U10.

Samples are coming from concrete structures, flooring composite materials, bedding mortars, joints, rendering materials with paint finishes.

In Field Evaluation of conservation treatments: water repellents products, integration mortars, passivation products

In the case of protective treatments 13 different commercial formulations have been tested. The products belongs to different chemical types: silanes, siloxanes, acrylics, fluorinated resins.

Evaluation of performances will be carried out by means of:

- Reflectance Colorimetry.
- Water absorption by capillarity with the contact sponge method

The second part of the study regards “**In field evaluation”** of conservation treatments and especially water repellents products. In this case a standard procedure can be adopted in order to get evidences of both effectiveness and possible harmfulness of the products. These latter have been chosen after a careful survey of what is available in the market. 13 different commercial products have been tested belonging to different chemical classes: silanes, siloxanes, fluorinated resins, acrylics. **The in situ evaluation have been carried out by means of reflectance colorimetry and water absorption by capillarity with the contact sponge method.** The evaluation of the product will be possible measuring the surface characteristics both before and after the application of the product. The same measure will be carried out as a final step of the project in order to understand the permanence of the water repellency after some month of ageing.

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Pilot construction site - The concrete condition assessment phase allows to identify the different situations, identifying the areas that require restoration and those that require an intervention that prolongs the useful life.

Analysis of the materials and state of conservation (concrete and repair patches, bricks and mortars).On site evaluation of the performances of the water repellent treatments, compared with untreated areas.

How to keep (what you can to keep)? We are testing the protective film that will prevent the ingress of water and CO2 in the material, slowing down the phenomena of carbonation;

What duration? Products promise a better performance, but they change the surface, transparent products; also experience anti carbonation products:

Apply these techniques are not decisive (not solve the case Study of corrosion of reinforcement) there are cases where this material already decayed:

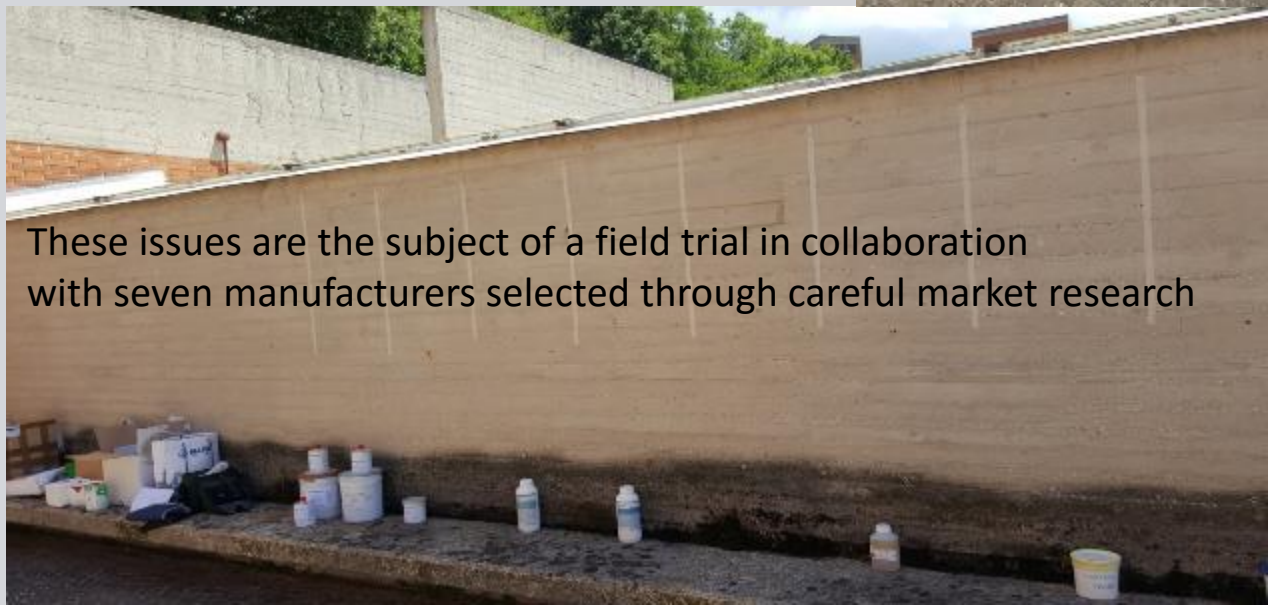
How to run the patches? In the 90 GDC realizes patches; He is still viable that solution? Is it possible to add thickness to perform greater protection of reinforcing rods?

With which materials to make the integration? Materials recovery (in the market): they have very different colors and textures from the concrete of the colleges; experimentation that we are running has the aim to understand how to reconcile the need to use a material commercially (coming over a requirement of the managers)

IN FIELD EVALUATION

- Evidence of carbonate

- Tests to verify the potential for corrosion of rebars

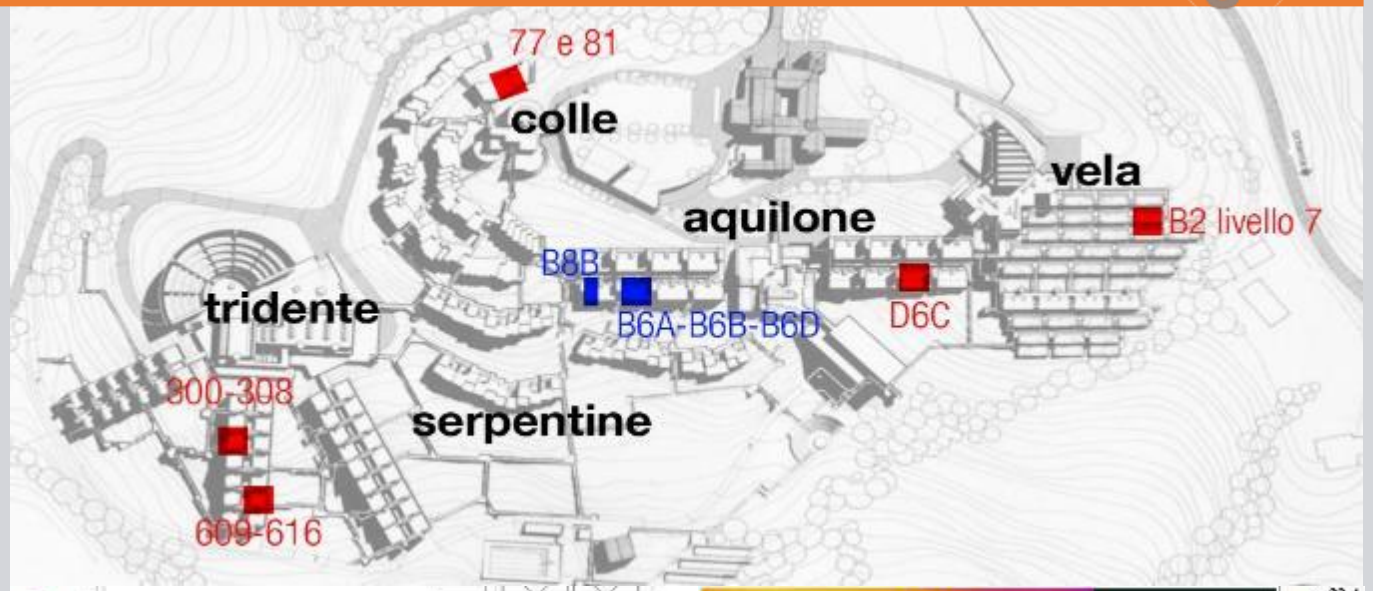


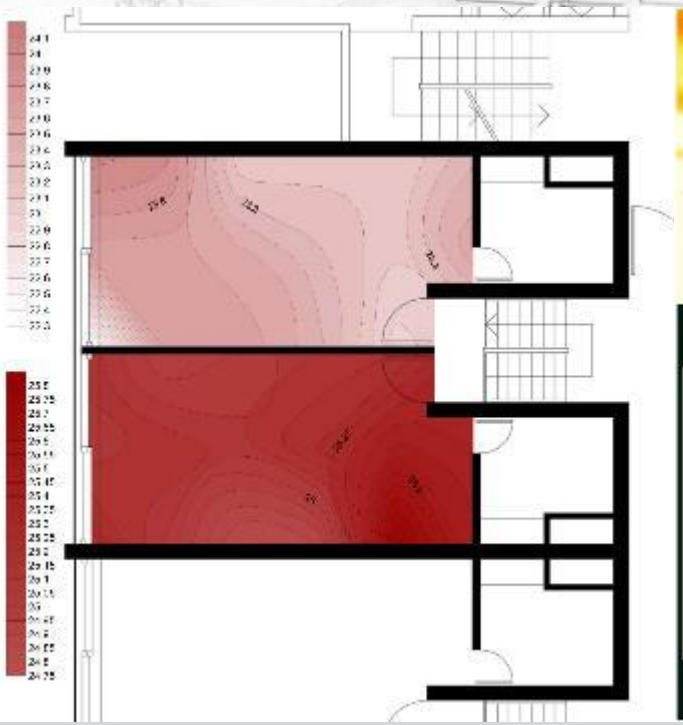
These issues are the subject of a field trial in collaboration with seven manufacturers selected through careful market research

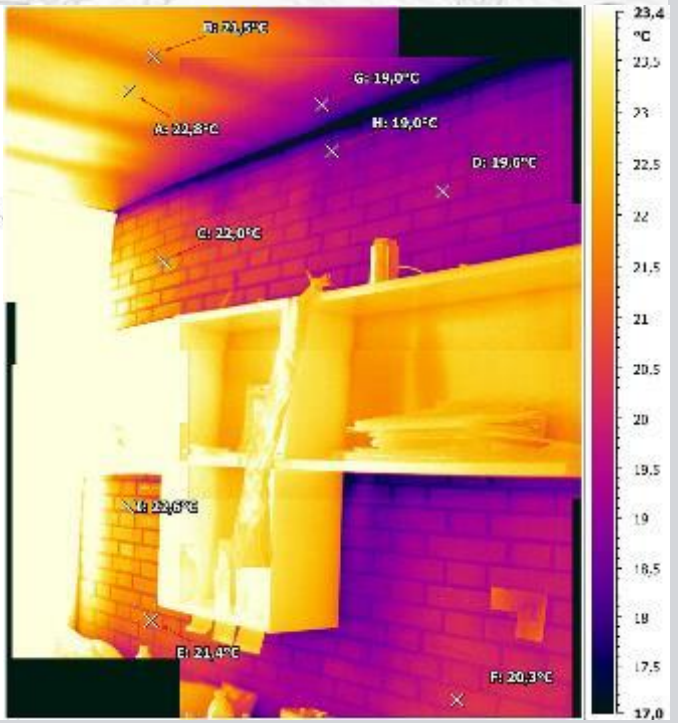
CECH Laboratory, Politecnico di Milano

- Psychrometric mapping of the interiors.
- Analysis of surface temperatures, heat losses and thermal bridges by thermal imaging.
- Indoor climate monitoring of selected residential cells.
- Evaluation of building-HVAC system energy performance.
- Assessment of energy retrofit proposals.

The map (top-right in the slide) highlights the sample residential cells that are being analysed seasonally (red) all-around the Collegi and those that are currently monitored by temperature and relative humidity sensors (blue).
The spatial distribution of temperature and humidity within the rooms have being surveyed on field through a digital psychrometer and then elaborated in order to obtain a psychrometric map representing the temperature and humidity gradients. The bottom-left image shows the distribution of temperature within two adjacent rooms of the Aquilone building in a warm Autumn day: a room is clearly colder than the other (around 2°C) and this is due to the influence of the non-insulated outer brick-wall (the top one in the image). This evaluation is confirmed by the thermal image (bottom-right) where the heat losses through the colder wall are evident, as well as the thermal bridges caused by the concrete structures and the heat gains due to the solar radiation.







…….main purpose to understand how buildings can shape social interactions and precisely which kind of social phenomena the distinctive De Carlo architecture of the Urbino colleges have created and (re)produced. Were those social effect the ones intended by De Carlo? Were there some other side-effects? Which ones?

1.1 The socio-legal regulation of the colleges
1.2 The social and architectural principles of the colleges
1.3 De Carlo Urbino colleges between ideal city and enclave
1.4 Daily life in the colleges between past and present.
1.5 Living in the colleges
2.0 Research tools.

SORGU uses a multidisciplinary and multi-tools research design, including qualitative (focus groups, interviews, participant observation, etc.), quantitative (secondary data, surveys, questionnaires, etc.) and document analysis such as:

2.2 CAWI Questionnaires.
2.3 Focus groups.
2.4 Semi-structured interviews.
2.5 Participant observation

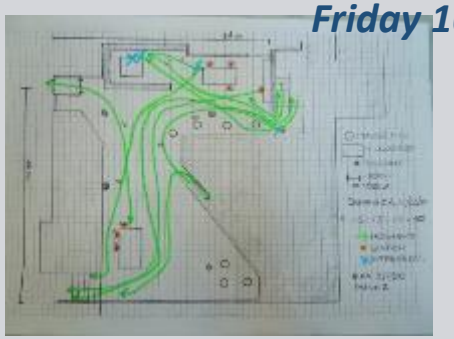
4 – Managing Use and Change: Current uses; new uses layouts.

What would you have liked to find in your room and you didn’t??


Wednsday 19° of October



Friday 16° of November



A.4 –SCHEDULES –
A. 4.1 FURNITURE

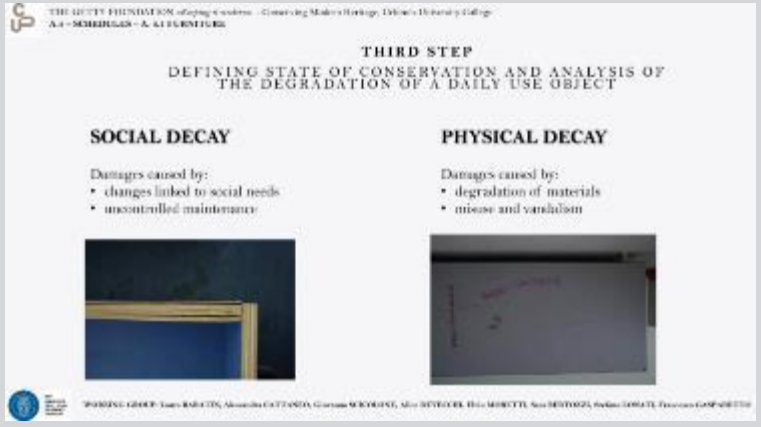
METHODOLOGY
FOR EVERY OBJECT

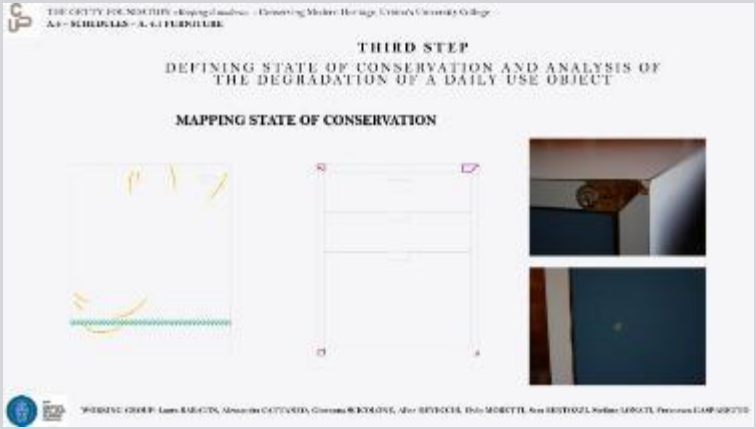
FIRST STEP
Detailed survey of all constituent parts of the object:
SURVEY AND DRAWING 2D and 3D + PHOTOS

SECOND STEP
Identification of industrial materials characterizing the object:
WITHDRAWALS AND LABORATORY ANALYSIS

THIRD STEP
Defining state of
conservation and analysis
of the degradation
FINDING TWO CATEGORIES OF DECAY

FOURTH STEP
Project of Intervention
FINDING SUITABLE METHODS OF INTERVENTION





All information and actions are recorded in a database, and as a true "control" can be updated over time, to monitor the state of conservation of the property and program interventions.
On the right you see **a "view" of the program, which allows managers to order the doors and windows** on the basis of conservation status, then immediately identifying the most urgent cases that need work

Below you see the state of conservation and analysis of the degradation of daily use objects:

GIS for georeferential objects within the Complex and **Condition Report** on the State of Conservation and intervention of each objects