ЖУРНАЛ ЭКОТЕХНОЛОГИЙ SUSTAINABLE TECHNOLOGIES MAGAZINE №1, 2016

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АРХИТЕКТУРА И БИЗНЕС:
ВИРТУОЗНОЕ СОЧЕТАНИЕ

Материалы предоставлены Studio d'architettura Gianfranco Sangalli
Фото: Массимо Кривеллари (© Massimo Crivellari)

ПРОЕКТ НОВОЙ ШТАБ-КВАРТИРЫ КОМПАНИИ RUBINETTERIE BRESCIANE BONOMI РАЗРАБОТАН АРХИТЕКТОРОМ ДЖАНФРАНКО САНГАЛЛИ (GIANFRANCO SANGALLI). НОВАЯ ПРОИЗВОДСТВЕННАЯ ПЛОЩАДКА ОТКРЫЛАСЬ В БРЕШИИ, ИТАЛИЯ, В 2015 ГОДУ. ЗДАНИЕ ПЛОЩАДЬЮ 53,3 ТЫС. КВ. М, РАЗДЕЛЕННОЕ НА ОТДЕЛЬНЫЕ ОБЪЕМЫ, ОТЛИЧАЮТ СТРОГОСТЬ ФОРМ И ВЫСОКОЕ КАЧЕСТВО СТРОИТЕЛЬСТВА. УТОНЧЕННАЯ ИГРА ПРОЗРАЧНЫХ ПОВЕРХНОСТЕЙ, ПОКРЫВАЮЩИХ ЕГО ЛЕГКОЙ И ПРОЧНОЙ СЕТКОЙ, ПОДЧЕРКИВАЕТ КОНСТРУКТИВНУЮ РАЦИОНАЛЬНОСТЬ ФОРМ И СОЗДАЕТ БОГАТОЕ ЧЛЕНЕНИЕ ПРОСТРАНСТВ.


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Новый управленческий и производственный центр Rubinetterie Bresciane Bonomi, ведущей компании в производстве запорной арматуры для трубопроводов и первого зеленого предприятия в Ломбардии, начал функционировать в городке Гуссаго, провинция Брешия. Промышленный комплекс расположен в коммуне Мандалосса, вдоль скоростного шоссе Padana Superiore SS11, недалеко от дороги, которая в будущем соединит Брешию с Бергамо и Миланом (Bre-Be-Mi).

Проект комплекса, выполненный архитектором Джанфранко Сангалли, включает промышленные здания общей площадью 53,3 тыс. кв. м – это производственные и вспомогательные помещения, а также офисы. Новая штаб-квартира обеспечивает компанию Rubinetterie Bresciane Bonomi рабочим пространством для продолжения своего дела, начатого еще в 1901 году.

На земельном участке площадью 117,5 тыс. кв. м предусмотрены и общественные пространства, занимающие территорию 23,4 тыс. кв. м (20% от общей площади), из которых 16,6 тыс. кв. м отведены под зеленые зоны, автостоянки и подъездные дороги. В состав нового комплекса входит фабрика площадью 30,0 тыс. кв. м, выполняющая производственные и складские функции; здание общей площадью около 4,2 тыс. кв. м, в котором 1,3 тыс. кв. м используются для размещения вспомогательных служб и офисов; крытое пространство площадью 22,0 тыс. кв. м, предназначенное для будущего расширения компании.

МЕТАЛЛИЧЕСКИЕ ЭЛЕМЕНТЫ

Комплекс Rubinetterie Bresciane Bonomi отличает широкое использование металлических элементов. Легкая металлическая сетка равномерно покрывает большие поверхности фасадов. Несущие конструкции производственных помещений выполнены из стали, чтобы обеспечить устойчивость однопролетному зданию 40-метровой ширины с пилообразной крышей. Это сделало возможным использование вертикальных шедовых окон для естественного освещения и увеличение количества фотоэлектрических панелей на наклонных поверхностях крыши.

Снаружи все фасады по периметру обернуты металлической сеткой огромных размеров, изготовленной из микроперфорированного металлического листа. При создании этой оболочки использовались технические приемы и детали, акцентирующие внимание на горизонтальном расположении объемов здания, которое прерывается только вертикально организованным автоматизированным складом высотой 17 м. Соответственно, производственные сектора представляют собой крылья здания, тогда как офисы и вспомогательные службы расположены вдоль дороги, пересекающей скоростную магистраль Padana Superiore, которая проходит по границе участка.

КАРКАСНАЯ КОНСТРУКЦИЯ

Характерной особенностью новой штаб-квартиры является несущий каркас. Корпус, в котором размещены офисы и вспомогательные службы, примыкает к производственным помещениям, выделяясь среди них, а затем, изгибаясь, располагается в одну линию параллельно шоссе.

В отличие от секторов с производственными помещениями здесь цельнометаллическая просечно-вытяжная сетка отделена от стены и удерживается стальным каркасом в виде периодически прерывающихся горизонтальных полос, чтобы освободить место для основных проемов (окон и дверей). Нижняя часть здания облицована вентилируемыми цементно-фибролитовыми плитами.

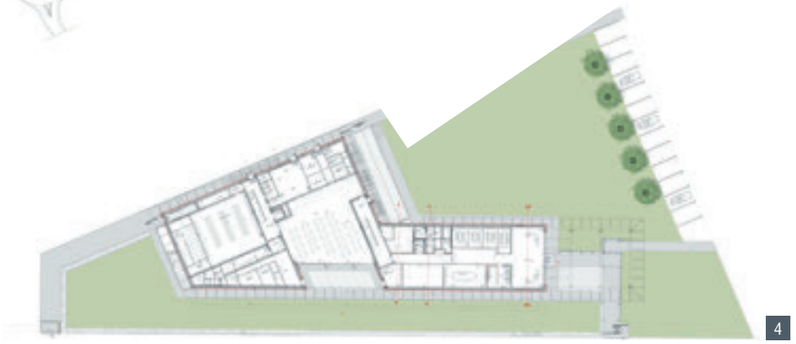
В зоне кафетерия оболочка практически полностью исчезает, как будто здесь происходит разрушение первичной массы, что в свою очередь подчеркивает наличие фронтального патио и делает акцент на больших окнах. А в той части здания, где расположена входная зона, отсутствие облицовочных материалов еще более акцентирует внимание исключительно на несущем металлическом каркасе.

ФУНКЦИОНАЛЬНОЕ НАЗНАЧЕНИЕ ПОМЕЩЕНИЙ

Описание из технического отчета Джанфранко Сангалли: «С точки зрения функционального использования здание поделено на два сектора. Первый высотой два этажа с подземным уровнем предназначен для размещения


3

Условные обозначения:
A – производственный корпус;
A1 – автоматизированные складские помещения;
B – офисное здание;
C – зона перспективного развития производства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информация

НОВАЯ ШТАБ-КВАРТИРА RUBINETTERIE BRESCIANE BONOMI (NEW HEADQUARTERS OF RUBINETTERIE BRESCIANE BONOMI)
Расположение: муниципалитет Гуссаго, провинция Брешиа, Италия
Заказчик: Rubinetterie Bresciane Gruppo Bonomi
Архитектор: Studio d'architettura Gianfranco Sangalli
Строительный надзор: Studio Cominotti
Художественное руководство: архитектор Джанфранко Сангалли
Инженерно-строительное проектирование:
– бетонные конструкции: инженер Алессандро Коминотти (Alessandro Cominotti)
– стальные конструкции: инженер Лука Падерно (Luca Paderno)
– механические и электрические инженерные системы: инженер Джованни Зилетти (Giovanni Ziletti)
Строительство:
– подрядчик: Impresa Arici F.lli Srl
– механические системы: Marco Lugli Impianti
– электрические системы: Elgen Srl
– стальные конструкции: Pitra Sas
– двери и окна (с использованием алюминиевого профиля Metra SpA): Pitra Sas
Мебель:
– оснащение операционных залов: Mascagni Spa
– оборудование офисов и освещение: Arredamenti Riva Spa
Разработка проекта: 2010–2013
Окончание строительства: 2015
Общая площадь: 53,3 тыс. кв. м
– фабрика: 30,0 тыс. кв. м
– офисы и вспомогательные службы: 4,2 тыс. кв. м

1 – Передний фасад промышленного комплекса и главный вход
2 – Производственно-складской корпус в оболочке из микроперфорированного металлического листа
3 – Генеральный план
4 – План первого этажа офисного здания с прилегающей территорией

прямая речь

АЛЬДО БОНОМИ (ALDO BONOMI), ПРЕЗИДЕНТ ХОЛДИНГА «БОНОМИ ГРУП»:
– Мы хотели, чтобы новая штаб-квартира в Гуссаго была простой, эффективной и максимально безопасной. Она была задумана как место для работы и жизни, которое вызывает чувство гордости у всех, кто приходит сюда каждый день, чтобы отдать все лучшее, что у них есть, получая взамен удовлетворение и реализацию личного потенциала. Мы воплотили мечту в жизнь, обновив наши столетние предпринимательские традиции. Мы надеемся, что это может стать стимулом для создания повсеместного благополучия и красоты.


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различных вспомогательных служб и расположен с восточной стороны здания. На первом этаже, разделенном коридором, с одной стороны находятся раздевалки, технические помещения, медицинский пункт, а с другой – кухня и кафетерий, причем последний с двойным светом.

Почти все комнаты на первом этаже имеют ленточные окна высотой 60 см, которые расположены между плитой перекрытия второго этажа и нижней стеной, облицованной модульными цементно-фибролитовыми панелями. Это сделано для того, чтобы скрыть от посторонних взглядов то, что происходит внутри, а также чтобы уменьшить до минимума потери тепла, что позволит зданию пройти классификацию по энергоэффективности с высокими показателями. Это же касается и использования листового металла для экранирования фасадов с большим количеством окон.

На южной стороне металлическая сетка обеспечивает максимальное проникновение солнечных лучей в зимний период и их частичную или полную нейтрализацию в другое время года. На втором этаже с одной стороны находятся жилые помещения для временного проживания обслуживающего персонала с отдельным входом с улицы и комната отдыха для сотрудников, а с другой – кафетерий и аудитория многофункционального назначения. Подвал зарезервирован для размещения инженерного оборудования и доступен прямо с улицы благодаря наклонной рампе, расположенной с западной стороны здания.

Второй сектор, или производственная зона, имеет три этажа. На первом этаже, помимо стойки администратора, есть залы ожидания, конференц-зал и различные службы. Эта часть здания также спроектирована с ленточными окнами на северной и южной сторонах, что было сделано как из эстетических соображений, так и с целью сохранения энергии, то есть с точки зрения исполнения она идентична первому сектору. На втором этаже находятся оперативные, коммерческие и административные офисы вместе с сопутствующими службами. Верхний этаж предназначен для управленческого персонала.

Все помещения, за исключением вспомогательных и технических, таких как, например, серверная, имеют перегородки, что обеспечивает максимальную гибкость при их использовании».

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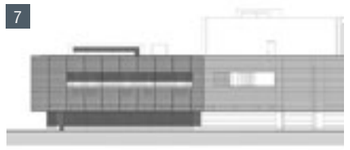

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5 – Кафетерий с двойным светом
6 – Входное фойе офисного здания
7 – Восточный фасад
8 – Западный фасад
9 – Северный фасад
10 – Южный фасад
11 – Металлическая фасадная конструкция


11

АРХИТЕКТУРА И ПРЕДПРИНИМАТЕЛЬСТВО

Новый комплекс представляет собой виртуозный пример сочетания архитектуры и бизнеса. В период финансового кризиса восстановление здоровых взаимоотношений между архитектурой и экономикой рассматривается как положительный опыт, как, например, данный комплекс. Действительно, этот проект представляет собой один из показательных примеров достойных взаимоотношений между культурой и предприимчивостью, между архитектурным производством и предпринимательством.

Когда речь идет о компании, которая известна на мировых рынках превосходной продукцией, особенно важен тот факт, что она проводит политику позиционирования своего производства как производства, оказывающего положительное влияние на тот регион, где оно размещается. По словам Джанфранко Сангалли, «главное в этом проекте то, что в нем интерпретируются потребности компании за счет комбинирования минималистской архитектуры с решениями, которые способствуют экологическому благополучию». ■

досье

ДЖАНФРАНКО САНГАЛЛИ родился в 1946 году в Брешии, Италия, изучал архитектуру в Архитектурном институте Венеции (Istituto di Architettura di Venezia, IUAV), который окончил в 1975 году. Его научным руководителем был Карло Скарпа, с которым у Сангалли началось профессиональное сотрудничество сразу после окончания учебы. Вскоре он открыл свою практику в Брешиа, и его деятельность первоначально в основном была сосредоточена на ремонте и реставрации исторических зданий. В этот же период он начинает работать с крупными компаниями, в основном занимающимися техническими разработками. Он проектирует стулья, мебель и выставочные стенды, которые они используют для представления своей продукции на самых значимых европейских выставках. Сангалли разрабатывает для них фирменные стили, используя все возможные способы для обозначения цветовых палитр их машин и механизмов. Его архитектурная мастерская также участвует в проектировании объектов в отраслях торговли и сферы обслуживания, больниц и общественных зданий, таких как кинотеатры, перепланировке городских площадей в Делло и Трензано, кладбищ в Делло и Монтикьяри. Джанфранко Сангалли выполнил несколько проектов в сфере жилой недвижимости, таких как восстановление древнего поселения в Бардолино, провинция Верона, и дизайн частных домов, большинство из которых в провинции Брешиа. Он занимался планировкой городских и сельских населенных пунктов, участвовал в разработке градостроительных концепций для муниципалитетов в провинциях Брешиа, Пьяченца и Феррара, представлял свои работы на конкурсах, на которых получил множество наград.

includes a number of innovative design solutions, including transformation of an abandoned industrial site; reducing light pollution; management of rainwater; reducing storm water runoff due to device green roofs; the use of grey water for toilets; heat recovery in the atrium and ventilation through laboratory fume hoods, and so on.

GENERAL INFORMATION

Great projects start with great partners. Oregon Health & Science University (OHSU), Portland State University (PSU) and Oregon State University (OSU) created a tenancy in common agreement to expand their academic and research programs. Through this alliance, the new OHSU/ PSU/OSU COLLABORATIVE LIFE SCIENCES BUILDING (CLSB) and OHSU SKOURTES TOWER (SKT) were conceived. The Owners selected the Architect and Contractor teams simultaneously, helping to ensure a highly collaborative project delivery. The technological compatibility of the Architect and Contractor was excellent, with both parties interested in leveraging technology to the fullest extent possible to deliver a large, complicated project in record time.

The 2.4 acre site is located near the banks of the spectacular Willamette River near downtown Portland, Oregon. This location is a part of the new 18-acre OHSU Schnitzer campus, only a sky tram ride down from the main Marquam Hill campus of OSHU and a streetcar ride from the downtown campus of PSU and adjacent to the new Tilikum Crossing light rail bridge (for light rail, buses, streetcar, pedestrians and bicyclists opening in fall 2015).

DESIGN

CLSB/SKT project comprises a 12-story north tower, a five story south tower and an atrium circulation area containing a total of 650,000 square feet of medical research laboratories, academic teaching laboratories, state of the art medical simulation education spaces, multi-use/ multi-functioning classrooms, conference rooms and lecture halls, retail spaces, a two level below grade parking garage and academic support amenities.

The upper five stories of the north tower contain the relocated OHSU School of Dentistry that includes patient clinic spaces, specialty dentistry operatories, professional dentistry continuing education spaces and academic faculty offices.

The south tower houses the relocated OSU College of Pharmacy, complete with a multimedia lecture hall, classroom spaces, conference rooms and academic faculty offices. Also located in the south tower is a clinical healthcare simulation program that includes fully fit-out exam and procedure rooms.

The design focuses on setting the state for the new OHSU campus on the south waterfront. The dynamic architecture speaks to the vibrant student and research population, focusing on creating common spaces for informal collaboration and crosspollination across populations and fields of study/research. The design places and emphasis on daylighting and views from public spaces that allow for "teaching and research on display."

FAST-TRACKED PROJECT

With funding coming from private sources and public bonds with a 'use it or lose it' expiration date, CLSB/SKT was awarded, conceived, entitled, constructed and delivered in only 38 months. The contractor began driving foundation piles 5 months after the design team was awarded its contract by the Owners.

For this extremely fast-tracked project, multiple pieces of the whole were simultaneously in design, permitting and construction. There were seven distinct permit packages with revisions for each that needed to go to the contractor and to the City for permitting.

The schedule has shown at right shows the actual project schedule, comparing it to traditional project delivery. The savings of 19 months would not have been possible without the team's reliance on technology for project delivery, as is outlined in this submission.

TEAMING & TECHNOLOGY

The design and construction team chose to collocate throughout the project. During design, as many as 30 Architect, Owner, Contractor and Engineering team members were colocated in the architect's offices. During construction, this same team was collocated at the construction site in job trailers. This colocation, including the robust internet and server connections to allow interaction with out-of-area consultants, was key to the success of the project.

In the marketplace, there is an overwhelming selection of technical tools. The trick is to select the proper tool for each use and circumstance, achieve buy-in from stakeholders and implement it across the entire project team. For CLSB/SKT, many tools were selected, each with their specific use. A few of those tools had deep and profound impacts, enabling the team to use real-time document and decision making updates to successfully deliver the aggressive project on schedule and on budget.

With 28 design team firms in ten states throughout twelve different cities, the use of modeling software, file exchange software, cloud-based collaboration technology and document management tools were critical to the project's workflow.

3D DESIGN MODELING

Building Information Modeling (BIM) was a key component for team member and stakeholder understanding and buy-in. With the compressed design schedule, ways to show potential designs, layouts and information for cost modeling were achieved through modeling design options.

Once the client group approved a concept, that particular option could be accepted with little to no rework; the selected option could be built upon toward the final design. The 3D model was a valuable tool to show user groups and stakeholders unfamiliar with reading drawings the progression of the design. With dynamic building geometry, communicating the design of the building any other way would have been a challenge.

Twenty-three individual models were developed for the various design disciplines, linked together to form a confederated model. A robust BIM management plan was developed to ensure modeling expectations for the various design and construction team members were clearly understood and carried out.

SYSTEMS INTEGRATION AND CLASH DETECTION

During the latter stages of design, the architect, engineers, contractor, and best-value subcontractors met in thrice-weekly clash-detection meetings, resolving systems conflicts during design and easing the 3D model transition to the subcontractors. Similarly, during construction, 3D models from the subcontractors were combined in Navisworks and weekly clash detection meetings allowed the contractor, subcontractors, architect and engineers to further coordinate systems at a finer level.

These clash-detection sessions were held via remote desktop, with the meeting host moving the team live through the 3D model. By remoting in, subcontractors were able to make changes to their respective 3D models in real-time during the meetings as clashes were highlighted on their screens.

CLOUD-BASED INFORMATION CONTROL

Over the course of any project, how decisions are documented and the information retained is often an afterthought. For this project, the use of Smartsheet as a cloud-based collaboration tool helped organize and archive the process. Everything from the actual decision made and direction given, supporting documentation, meeting date and attendees could be viewed by all team members wherever they had an internet connection.

The ability to simultaneously have multiple people in the same document from several different meeting locations reduced the number of meetings people had to attend, the hours required for consolidating the information post-meeting and time spent tracking down lost documents.

This cloud-based tracking solution was used to log the feedback of dozens of user groups and track the design team response to each item. For CLSB/SKT, there were over 50 different Smartsheets. These were used for design issues, tracking and constructability reviews to jurisdiction check sheet comments and document issuance tracking during construction.

CONSTRUCTION TECHNOLOGY

At each transition point from design to construction, the 3D models were turned over to the general contractor and their subcontractors. Since key subcontractors had been involved heavily during the design process in a design assist capacity, there was a deep understanding and familiarity with the project.

And since they had each been intimately involved early, the technical tools were very familiar to them. Several subcontractors were contracted during the design phase as best value:

- Mechanical subcontractor
- Electrical subcontractor
- Plumbing subcontractor
- Elevator subcontractor
- Envelope, Window, Curtain Wall subcontractor
- Metal panel subcontractor

SYSTEMS FABRICATION

As each subcontractor prepared their layout, coordination, submittals and shop drawings, the team once again assembled for weekly meetings to resolve modeling conflicts. Each anchor point, bolt, rod, pipe assembly, connection point, material and object was scrutinized against other subcontractor information.

Since the team could see all of the pieces at once, they could develop ways in which to work and integrate with their trade neighbor. Subcontractors had the confidence that installed work was accounted for and coordinated with their subsequent work.

This process of checking and then verifying building component integration led to several innovations that benefited the owner and therefore the project. Plumbing systems could be unitized and fabricated off-site in factory controlled settings and then delivered to the site and installed. Duct work could also be prefabricated offsite, delivered and installed with minimum rework.

Each piece had a specific location including straight runs, bends and elbows, offsets and 'tight squeeze' locations adjacent to other building elements. The team achieved record installation rates while increasing quality, safety and generating approximately 15% cost savings.

The use of specific technologies (Revit and then Navisworks) made this process possible.

CONSTRUCTION LAYOUT

Five months before the program and interiors documents were due to be issued, the Contractor approached the design team with an opportunity to save the Owners money. If the anchors for the Mechanical, Electrical, Plumbing and Fire Protection overhead work could be cast top-side into the concrete slabs rather than drilled in via lifts later, it would save the project nearly $1,000,000.

In order to do this, the team would need to lock-down the locations of the interior partitions and design the routing of the MEP systems, then hand off the 3D electronic model to the Contractor and Subcontractors for hanger location determination and field surveying/placement.

The design team agreed to a "lockdown" schedule, working closely with the Owners and Users to verify then model final partition locations and MEP layouts, starting at the bottom floor of the 14-story building and working progressively upwards in two-week increments that stayed just ahead of the concrete pour schedule. No 2D drawings were issued; this was all done via the 3D model.

This innovative and highly collaborative "just-in-time delivery" approach highlighted how trust-based teams that leverage technology can drive real cost savings to Owners.

ELECTRONIC CONTRACT

The team used an all-electronic construction administration process. All RFIs and Submittals were submitted and reviewed electronically. In order to avoid the need to consolidate comments or forward documents in a chain of custody, the team used BlueBeam Studio to create online work sessions that reviewers and responders could log into to make comments. The software tracked which comments were made by who, and when they were made.

This allowed for an extremely efficient review and response process by the architects, consultants, and owner coordinators. This collaborative cloud-based solution resulted in RFI turnaround times of 4.3 days, and Submittal turn-around times of 8.8 days, remarkable for a project of this scale and complexity.

ELECTRONIC CONTRACT AND VERSION CONTROL

The contractor assembled and maintained a PDF-based "hyperlinked set" using Bluebeam for all team members to use. The hyperlinked set included issued addenda, architectural bulletins (ASIs, PR and CCDs), RFIs, submittals, O&M information and photo documentation. A script file automatically copied the digital files to team members' servers each day to ensure the entire design and construction team continuously had the most up to-date construction documents in an easy-to-use format.

The total savings to the owner for this all-digital process was just under $10,000,000 when accounting for print costs and labor hours for all sets issued to all team members (design team, contractor, subcontractors and owners) and deducting for a technologist to digitally post all documents issued.

In the field, display kiosks were provided by the contractor for all to use that allowed access to the hyperlinked set. This eliminated the need for field crew subcontractors to travel back and forth to their office or trailer to review documents.

VISION TO REALITY

Without a strong teaming attitude and proactive management of communication and information, combined with leveraging technology and cloud-based software tools, the project schedule would not have been achieved.

In the end, the combination of industry modeling technology (Revit and Navisworks), cloud-based task-management and documentation tools (Smartsheet) and document management and mark-up software (Bluebeam) allowed the project team to achieve a large, highly complex, mixed program, multi-owner project on an extremely fast-track schedule.

Process and collaboration were everything. Choosing the right technology tools for the right process was equally critical.

OHSU/PSU/OSU COLLABORATIVE LIFE SCIENCES BUILDING AND OHSU SKOURTES TOWER

Location: Portland, Oregon, United States
Project Owner: Oregon University System and Oregon Health & Science University
Submitting Architect: SERA Architects
Joint Venture or Associate Architect: CO Architects
Project Completion Date: June, 2014
Project Category: New Construction
Building or Project Gross Floor Area: 198120 m^2
Total project cost at time of completion, land excluded: $232,000,000.00
Awards:
American Institute of Architects 2015 TAP Innovation Award
2015 AIA Top Ten Green Projects

Jury Comments:
This was a well written and impressive submission. New ground was broken here in project delivery with an impressive outcome. This is a huge complex program consisting of three different owner organizations, LEED platinum building, challenging architectural parties and was completed in an incredible 38 months. They have a clear presentation of the tools used and the savings identified. The scale and speed at which they used the technologies and processes here make this project stand out. ■

INDUSTRIAL ENGINEERING

Architecture and Enterprise: Masterful Combination

(p. 110)

MATERIALS PROVIDED BY STUDIO D'ARCHITETTURA GIANFRANCO SANGALLI
PHOTOS: © MASSIMO CRIVELLARI

The new management and production site of Rubinetterie Bresciane Bonomi in Brescia was designed by architect Gianfranco Sangalli. A project covering 53,300 square meters divided into volumes distinguished by extreme formal clarity and construction quality. A subtle play of transparencies introduces the buildings used for production covering them with a light and rigid

mesh which expresses its structural rational in the management building creating a rich articulation of spaces.

In Gussago, in the province of Brescia, the new management and production site of Rubinetterie Bresciane Bonomi, leading company in the production of valves and the first green company in Lombardy, recently became operational. The industrial complex is located in the locality of Mandalossa, along the route of the old Padana Superiore SS11 highway and near the future slip road uniting Brescia with Bergamo and Milan (Bre-Be-Mi).

The design of the complex, by Gianfranco Sangalli, includes the construction of buildings used for manufacturing covering a total of 53,300 square meters, divided into the factory and the site used for offices and services. This new headquarters provides Rubinetterie Bresciane Bonomi with a work and production site in which to continue the business started as far back as 1901.

The project is located on an area of 117,500 square meters, where there are spaces intended for public use covering 23,400 square meters (20% of the total area), of which 16,600 square meters are given over to green areas, car parks and adjoining roads. The new facility is now comprised of a factory of around 30,000 square meters used for manufacturing and as a warehouse, and a building, with a gross floor area of around 4,200 square meters, equal to a covered floor space of around 1,300 square meters, used for related services and offices and with a remaining covered floor space of 22,000 square meters available for the future expansion of the company.

LIGHT METALLIC MESH

The entire Rubinetterie Bresciane Bonomi complex is characterized by the use of metallic elements. A light metallic mesh uniformly covers the large factories. The structure of the factories is made of steel in order to cover the 40 metre width with a single span and expand the sawtooth roof areas. This has made it possible to exploit the natural light on the vertical planes of the sawtooth roof and extend the presence of photovoltaic panels arranged on the inclined planes.

On the outside a vast metallic texture made of micro-perforated fretted sheet metal runs along all the perimeter surfaces. This cladding exploits installation techniques and details that tend to accentuate the horizontal dimensions of the volumes, counteracted only by the vertical arrangement of the automated warehouse which is 17 metres high. The production units accordingly define the architectural wings against which the office and services building stands out, positioned along the road axis of the Padana Superiore highway which borders the area.

STRUCTURAL FRAME

The structural frame is a prominent feature of the new headquarters. The building housing the services and offices is adjacent to the factories it stands out against, then flexing until it lines up parallel with the highway.

Unlike in the volumes that house the factories, here the expanded metal mesh, detached from the wall structure and supported by a frame made of steel rings, mainly runs in horizontal bands and is repeatedly interrupted to make room for the main openings. A ventilated fibre-cement wall protects the lowest part of the volume.

In the cafeteria area the cladding has been almost entirely eliminated, as if there had been a sort of erosion of the primary mass, highlighting the presence of the front patio and emphasizing the large windows. At the end of the building, where the entrance area is located, the removal of material from the building increases further leaving only the structural frame on view.

HEADQUARTERS

From the technical report by Gianfranco Sangalli:

"From a distribution perspective this building is divided into two sections. The first, reserved for services, is located on the eastern side and has two floors above ground and a basement. On the ground floor, divided by a corridor, are most of the changing rooms, services and rooms used as the infirmary on one side, and on the other the kitchen and the cafeteria, the latter being double-height.

Almost all the rooms on the ground floor are lit by strip windows 60 cm high, positioned between the floor slab of the first floor and the wall below clad with modular fibre-cement panels both to hide the functions performed inside from view and to reduce heat transmission to a minimum and allow the building to obtain a high energy classification. The same applies to the use of sheet-metal screening on the surfaces with the most windows.

On the south side they permit maximum exploitation of the sun's rays in the winter and their partial or total neutralization in the other seasons. On the first floor there are accommodations for the caretakers with an independent entrance from the outside and a relaxation room for staff on one side, and on the other the managers' cafeteria and an auditorium with annexed facilities. The basement is reserved for technical equipment rooms and can be entered from the road level via a ramp on the west side of the building.

The second section, the operational area, has three floors. On the ground floor, in addition to the reception, there are waiting rooms, a meeting room and services. Here too, for both formal appearance and energy containment reasons, the waiting rooms on the north and south sides have the same strip windows and execution methods found in the previous section. On the first floor are the operations, commercial and administrative offices together with the relative services. The top floor is reserved for the management.

The spaces, excluding the accessories and technical equipment or servo rooms, have been arranged with walls set up to allow for maximum flexibility."

ARCHITECTURE AND ENTERPRISE

At a time of financial crisis, reconstructing a healthy relationship between architecture and the economy also counts as a positive experience such as this. Indeed, the project represents one of the emblematic cases of a virtuous relationship between culture and enterprise, between architectural production and entrepreneurship.

An important factor, especially when the business, known for its excellent production which has challenged international markets, also manages to establish itself with a positive impact in the area where it is located. Gianfranco Sangalli commented: "The project has an essential character that interprets the needs of the company combining the choice of minimal architecture with solutions that encourage environmental well-being."

Aldo Bonomi, President and MD Bonomi Group:

"We wanted the new headquarters in Gussago to be simple, efficient and to have maximum security levels. It has been designed as a place for work and life, producing a sense of pride in all those who enter it every day to give the best of themselves, obtaining just satisfaction and personal fulfilment from it. We have brought a dream to life, renewing our centennial entrepreneurial tradition. Our hope is that it may be a stimulus to create widespread well-being and beauty."

Gianfranco Sangalli (born in Brescia, Italy, in 1946) studied architecture at the Istituto di Architettura di Venezia (IUAV) where he graduated in 1975. His thesis advisor was Carlo Scarpa with whom he starts a professional collaboration immediately after his graduation. He soon opened his practice in Brescia and his activity is initially mostly focused on renovation and restoration of historical building complexes. At the same time, he starts collaborating with large companies, mainly involved in the field of mechanics, for which he designs chairs, furniture and exhibition stands they use for presenting their products at the most important European fairs. He is often in charge of defining the corporate identity for these companies and he goes all the way to defining the color palettes for their machinery.

His architecture studio was also involved in projects for commercial activities and for the service industry, for hospitals (like the Hospital in Gussago) and for public spaces (the requalification of the Metropol and of the Astra movie theaters in Brescia, of the Casinò movie theater in Gardone Riviera, of the auditorium in Trenzano; the reconversion of the Eden movie theater in Brescia, the requalification and urban furnishing of piazzas in Dello and in Trenzano) as well as for cemeteries (the Mortuary at the Richiedei Hospital, the extension of the cemeteries in Dello and in Montichiari).

Gianfranco Sangalli also completed several residential projects, such as the recovery of an ancient village in Bardolino (Verona) and the design of houses, many of them located in the Province of Brescia.

He is also engaged in town and country planning and he took part in the conception of several urban plans for municipalities in the Provinces of Brescia, Piacenza and Ferrara. He participated in several competitions and received numerous awards.

NEW HEADQUARTERS OF RUBINETTERIE BRESCIANE BONOMI

Location: Municipality of Gussago – Province of Brescia – Italy
Client: Rubinetterie Bresciane – Gruppo Bonomi Via Massimo Bonomi N. 1
Architect: Studio d'architettura Gianfranco Sangalli – Brescia – Italy
Site construction supervision: Studio Cominotti – Brescia - Italy
Artistic direction: Architect Gianfranco Sangalli – Brescia - Italy
Structural engineering:
Concrete: Ing. Alessandro Cominotti – Brescia – Italy
Steel: Ing. Luca Paderno – Cossirano (Brescia) - Italy
Mechanical and electrical engineering: Ing. Giovanni Ziletti – Brescia - Italy
Contractor: Impresa Arici F.lli Srl – Gussago (Brescia) – Italy
Mechanical systems: Marco Lugli Impianti – Lumezzane (Brescia) – Italy
Electrical systems: Elgen Srl – Paderno Franciacorta (Brescia) – Italy
Steel carpentry: Pitra Sas – Cossirano (Brescia) – Italy
Doors and windows: Pitra Sas – Cossirano (Brescia) – Italy
Realizzata con trafilati Metra Spa - Rodengo Saiano (Brescia) – Italy
Furniture:
Equipment of operational rooms: Mascagni Spa – Casalecchio di Reno (Bologna) – Italy
Equipment of managerial offices and lighting: Arredamenti Riva Spa – Brescia – Italy
Program and dimensions
Factory: 30.000 square meters
Offices and facilities: 4.200 square meters
Project: 2010–2013

INNOVATIVE TECHNOLOGY ENERGY EFFICIENCY

Carrier: How to Reduce Energy Consumption in Hotels

(p. 116)

TEXT: MIKHAIL TEREKHOV, SENIOR TECHNICAL EXPERT, PH.D. IN ENGINEERING SCIENCE, ASHRAE MEMBER

Globally, buildings account for 40% of total energy consumption, significantly higher than energy used for transportation or industry. Within buildings, heating, ventilation and air conditioning (HVAC) takes up the largest slice of the energy consumption. This proportion is approximately 40% in the US and is expected to be much higher in the warmer and more humid tropical weather of South East Asia.

Among buildings, hotels are some of the most energy intensive due to the long operating hours and high demand for comfort cooling. Comfort cooling could account for about 60% of the total hotel energy consumption in tropical weather. And the highest energy consumption area is concentrated in the chiller plant system. Chiller plant system in hotel is typically the single largest consumer of energy. It could account for an estimated 45% of the total hotel energy consumption. To save energy, and electricity bills, it is critical that chiller plant systems are operating at maximum efficiency at all time. With the new technologies, product and controls solutions available and tested in the field, there are significant opportunities to improve chiller plant efficiency of existing buildings, particularly energy intensive buildings such as hotels.

The application of modern technologies and equipment for air-conditioning systems, refrigeration, monitoring, management and control, tested in real conditions (on real projects / objects), provides new opportunities for improving energy efficiency refrigerant centers of existing buildings, including such energy-intensive as are hotels.

Carrier's "Energy Savings in Hotels" is a program specifically designed to help hotels identify, realize and sustain significant energy savings from existing chiller plant systems.

Building comfort cooling systems are typically designed to cater for peak load, with some safety factors to cater for unforeseen future demand. Equipment are evaluated based on the full load efficiency performance. However, in actual operations, hotels are often operating at part load.

In order to save energy in a hotel, it is critical to map the load profile of the building, and select equipment for the chiller plant system that perform most efficiently at the particular load profile.

In order to successfully solve the problem of energy conservation, it is necessary at the design stage to build the profile of the load on the building and select equipment, which operates in the most energy-efficient modes under real operating conditions: cooling, ambient air temperature, the temperature values, as well as heat transfer agent's and cooling media consumption, and so on.

Chiller plant efficiency is most commonly measured in "input kW per refrigeration ton" (ikW/ton).

Chiller plant system efficiency has a direct impact on energy consumption, and therefore, the electricity bill. Annual cost of energy in chiller plant system could be calculated by multiplying the following factors:

– Average building cooling load (kW)
– Hours of operation per day (hour)
– Days of operation per year (day)
– Chiller plant system efficiency (ikW/ton)
– Electricity tariff ($/kWh)

A hotel with an average cooling load of 500 tons operating 24 hours, 365 days per year, at chiller plant efficiency of 1.2 ikW/ton, with electricity tariff of $0.27/kWh would spend about $1.4 million per year or $118,000 per month on chiller plant system. If the chiller plant efficiency could be improved from 1.2 ikW/ton to 0.7 ikW/ton, all other factors being equal, the hotel could reduce energy use for chiller plant system by 41.7%. This translate to a saving of $590,000 per year, or $49,000 per month.

ENERGY SAVINGS IN HOTELS

The objective of Carrier's "Energy Savings in Hotels" program is to, given a required load and operating conditions of a hotel, improve the chiller plant efficiency, and reduce the electricity bills for hotels.

Carrier seek to provide an innovative and sustainable solution to help hotels achieve energy savings. The core of this program are:

– New high efficiency (full and part load) chillers packed with excellent features for retrofit in existing buildings.
– Energy recovery solution of excess heat.
– System configuration tools to help select equipment for optimal operation.
– Chiller Plant Optimization program that continuously modulate equipment for maximum efficiency.
– Green-based Maintenance that monitor, maintain and verify system performance.
– Performance Guarantee by Carrier to ensure that efficiency targets are attained and sustained.

Carrier's "Energy Savings in Hotels" Program starts with a commitment to conduct a Health Check on site, for a nominal fee. The fee could be waived in case Carrier is engaged to implement the retrofit work within 6 months. Carrier will conduct a Health Check and provide a detailed report, proposal and target savings. To ensure sustained savings, Carrier provides long term service and performance guarantees.

"Energy Savings in Hotels" Program helps hotels improve chiller plant system efficiency, reduce energy consumption, achieve savings, reduce hotel carbon footprint and conserve our finite natural resources for future generations.

In the next issue of our magazine we'll consider in details each of the stages of the program "Energy Saving in Hotels", as well as energy-efficient equipment and system solutions of Carrier, used for its implementation.

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