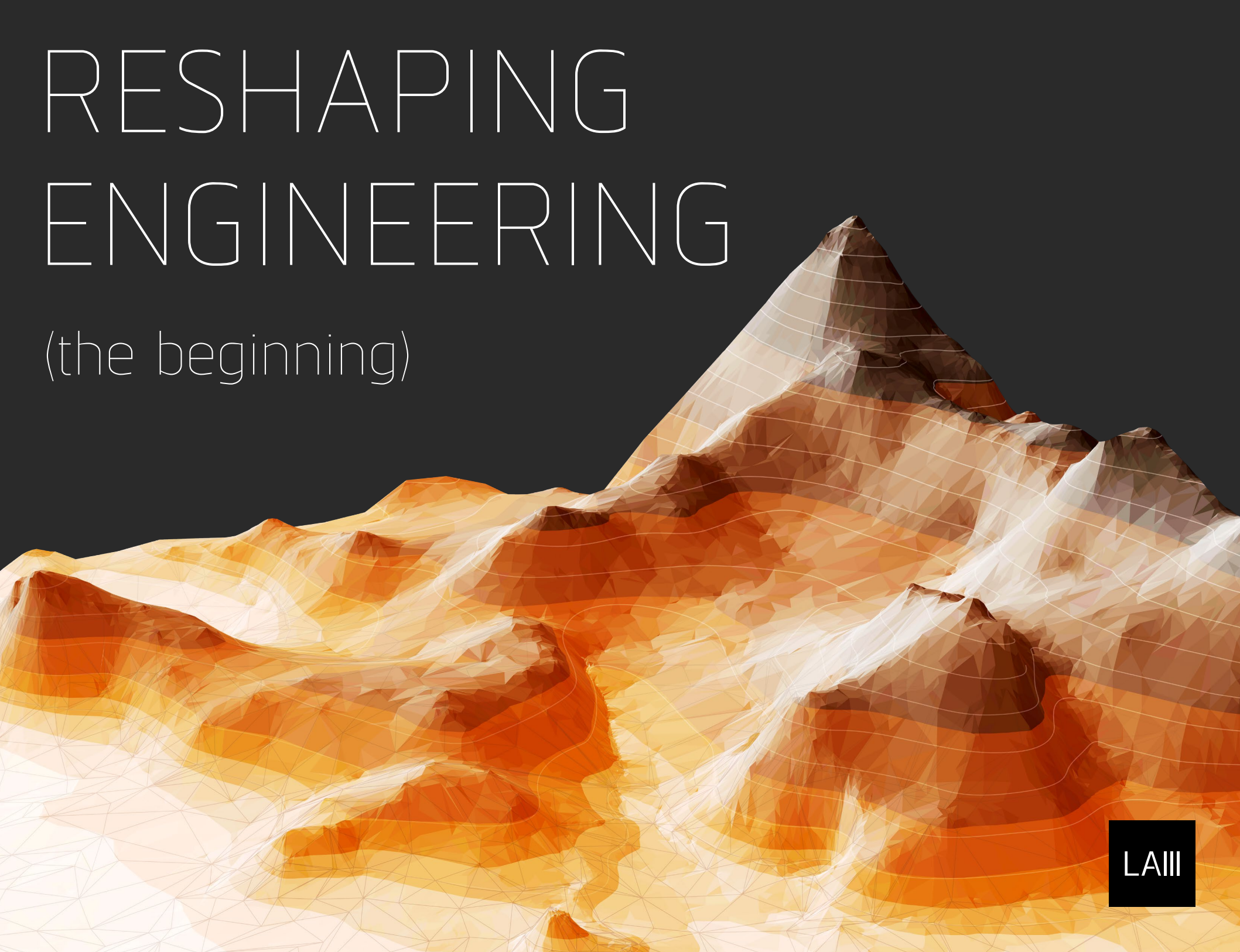
RESHAPING ENGINEERING

(the beginning)



LAIII

LOPES ASSOCIATES
Consulting Engineers

THE DYNAMO

Who We Are

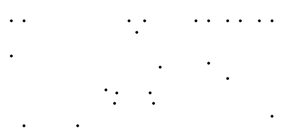
dy • na • mo [dahy-n*uh*-moh] *noun* (plural dynamos) 1. a device which changes energy of movement into electrical energy. 2. an energetic force. 3. an extremely energetic person.

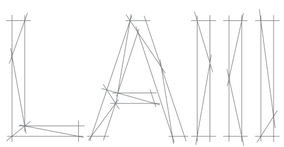
Profile

LAIII — Lopes Associates is a young company, founded in Porto, in 2014. The ambition to face new challenges led the three partners to break away from the past and create and develop a new generation of engineering, based on knowledge, rigor, innovation and creativity.

OUR LOGO, OUR IDENTITY

TRIANGLES HAVE ALWAYS BEEN A FUNDAMENTAL GEOMETRICAL SHAPE, WITH ENORMOUS SIGNIFICANCE, SPECIALLY NOWADAYS. THEY NOT ONLY REPRESENT THE TWO BASIC DIMENSIONAL SHAPE BUT ALSO ARE THE SIMPLEST GEOMETRICAL DECOMPOSITION OF ANY COMPLEX FORM. THEY ARE THE FOUNDATION OF THE GEOMETRICAL 3D MODELING AND THEY ARE USED EVERYDAY IN ARCHITECTURE AND ENGINEERING, SUCH AS, ON A TERRAIN MESH, A PATTERN, OR ON A TOPOGRAPHIC PROJECTION. FOR THESE REASONS, WE THOUGHT WE SHOULD TRY TRIANGLES!

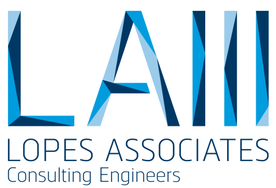




Nowadays, it is evident that the traditional ingredients applied in engineering, architecture and in construction, limit its evolution in the aspiration to go forward, to follow new paths and to think outside the box, because there are no standard solutions for unique problems.

The search of simple solutions means, many times, to navigate complex paths, putting predictability and stability aside, embracing the unknown, changing and believing.

TO FOLLOW NEW PATHS AND TO THINK OUTSIDE THE BOX.

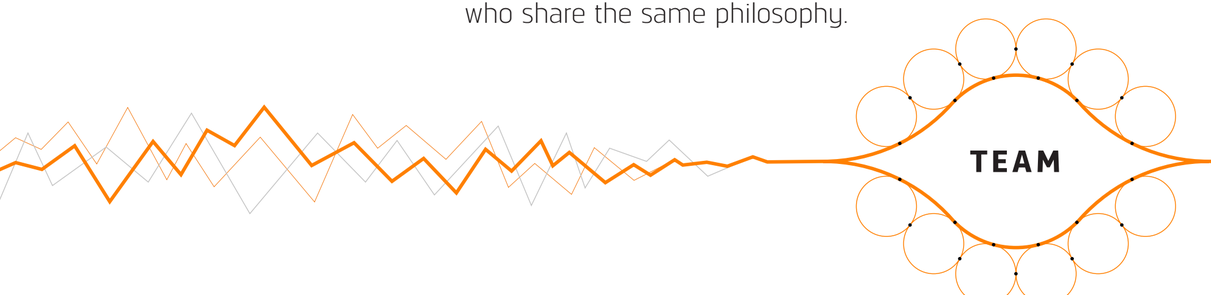


Team and Partners

Despite the youth of the company, the accumulated experience of our team in a wide spectrum of national and international projects, involving notable architects and clients, allows us to face new challenges in a safe and bold way.

Our multi-disciplinary team, has advanced skills in various fields of civil engineering. We are specialists in various areas, such as; structures, geotechnics, building physics and urban infrastructures, assisted by qualified technicians. This allows us to carefully fulfil every requirement.

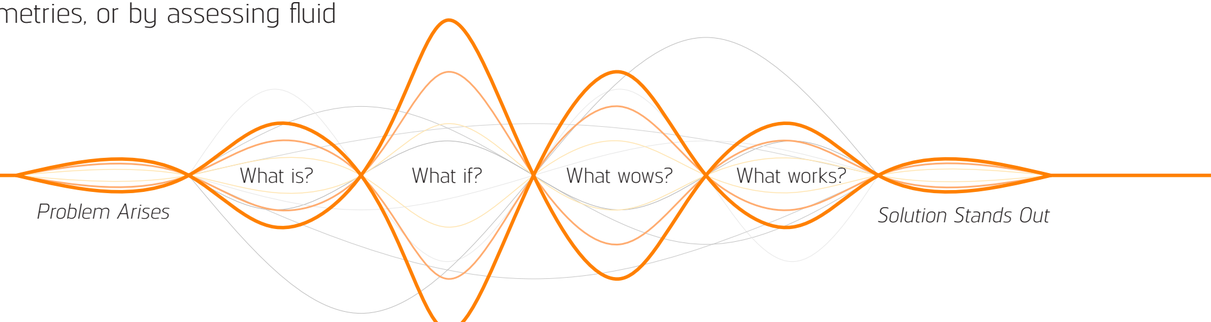
On a global vision, we articulate our activity with other partners who share the same philosophy. This fact, allows us not only to provide complementary services, as well as, adjust to different scales and manage resources in a more effective way.



What Moves Us

The constant contact with the state of the art, the connection to professional and academical institutions and the constant awareness of research and development activities are the fundamental basis to progress technically, either by doing the analysis of complex structures, by studying parametric geometries, or by assessing fluid dynamics. We face any technical advances as an opportunity to add value to what we do. An unknown opportunity is a rejected option.

The search for solutions is what moves us, the capacity and the knowledge to overcome problems, the quality and the technical rigor, the sustainability and the elegance of the result, the maximization and resources optimization, the challenge. But, above all, curiosity and the will to learn are what moves us.



DE-
CONSTRUCT

What We Do and How

de • con • struct [dee-k*uh* n-struhkt] *verb* 1. analyze (a text or linguistic or conceptual system) by *deconstruction*. 2. reduce (something) to its constituent parts in order to reinterpret it.

Expertise

Nowadays, it is not enough to have the freedom to meet the client's basic requirements, we also need to meet the user's expectations, which implies understanding everything that is behind certain objectives. Overcoming difficulties requires understanding the demands of a diversity of stakeholders, not only during the process (of the project production), but also afterwards, during the usage stage (as a final product).

It is not just weaving independent solutions, it is necessary to take on the commitment and have the flexibility to cooperate with different stakeholders, have the expertise to filter the noise and, thus, shape the bridge between the requirements and needs of the clients with the expectations of the users.

Disciplines Expertise

Our activity comprises of a series of disciplines for which we are highly prepared, with emphasis on the following:

Buildings

Structures / Special Foundations / Water Supply / Gas Supply / Wastewater Drainage / Stormwater Drainage / Thermal and Acoustic Analysis / Natural Ventilation / Fire Protection

Urban Infrastructures

Retaining Structures / Geotechnical Interventions / Urban Arrangements / Water Supply and Distribution Systems / Wastewater and Stormwater Systems / Gas Systems / Road Design

We provide other technical disciplines in association with our partners with whom we usually work.

Provided Services

We are available and prepared to provide a variety of quality services such as:

Feasibility Studies / Partnerships in Competitions / Consultancy / Technical Advice / Conceptualization / Technical Design / Technical Detailing / Design Checks / Project Revision and Assessment

Day-to-day

We face the challenges that arise as a team, always. It is fundamental for us to share problems, concerns and advice.

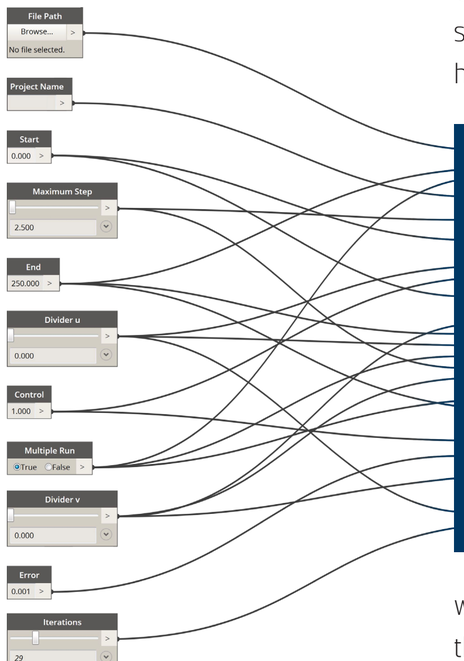
We see the coordination between all of us as a necessity to obtain the desired results, mostly by the client. We rely on solid planning and on cautious organization. We believe the attention to detail is not a thing of the past. We do not see technology as a headache but as a powerful tool to support our thoughts.

WE BELIEVE THE ATTENTION TO DETAIL IS NOT A THING OF THE PAST.

Tools

In order to meet the internal and external needs, including standards, timings, quality and, mostly important, the expectations, we use a vast collection of software applications on a daily basis. In addition, we also develop some application to strengthen our activity and to assist us on very thorough projects that require us to be meticulous. We are continually looking over the latest developments and curious to try new tools. Despite our openness, the selection of the most used applications in our office are presented in the following list:

- AutoCAD®
- Civil 3D® and StormNET®
- Rhino3D® and Grasshopper®
- Revit® Structures and MEP
- Vasari and Dynamo
- Robot™ Structural Analysis
- Octopus
- CypeCAD and Cype MEP
- Metal 3D



Excellence

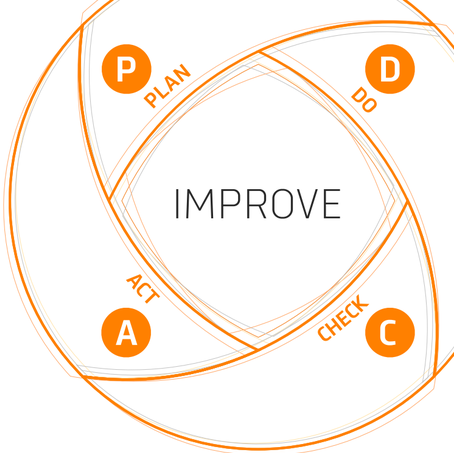
Creating something involves spending energy doing it. Being honest with ourselves means we have to be careful tailoring the solutions with the deserved quality, avoiding shortcuts to any substandard result. For this reason, we outline and follow our set of processes of our quality management system, ensuring every variable is taken into consideration and any deviation or mistake is tuned without any major setback.

QUALITY MANAGEMENT SYSTEM

THIS IS A SET OF COORDINATED ACTIVITIES TO DIRECT AND CONTROL AN ORGANIZATION IN ORDER TO CONTINUALLY IMPROVE THE EFFECTIVENESS AND EFFICIENCY OF ITS PERFORMANCE.

THE ISO 9000 IS A FAMILY OF INTERNATIONAL STANDARDS DESIGNED TO HELP ORGANIZATIONS TO DEAL WITH THE FUNDAMENTALS OF QUALITY MANAGEMENT SYSTEMS.

ISO 9001 IS ONE OF THE MOST WIDELY USED MANAGEMENT TOOLS IN THE WORLD TODAY.



The rigorous implementation of such methodology requires synchronized work to make everything fit together. However, we have no doubts that our work and efforts, focusing on excellence, will pay off in the end.

MAKING

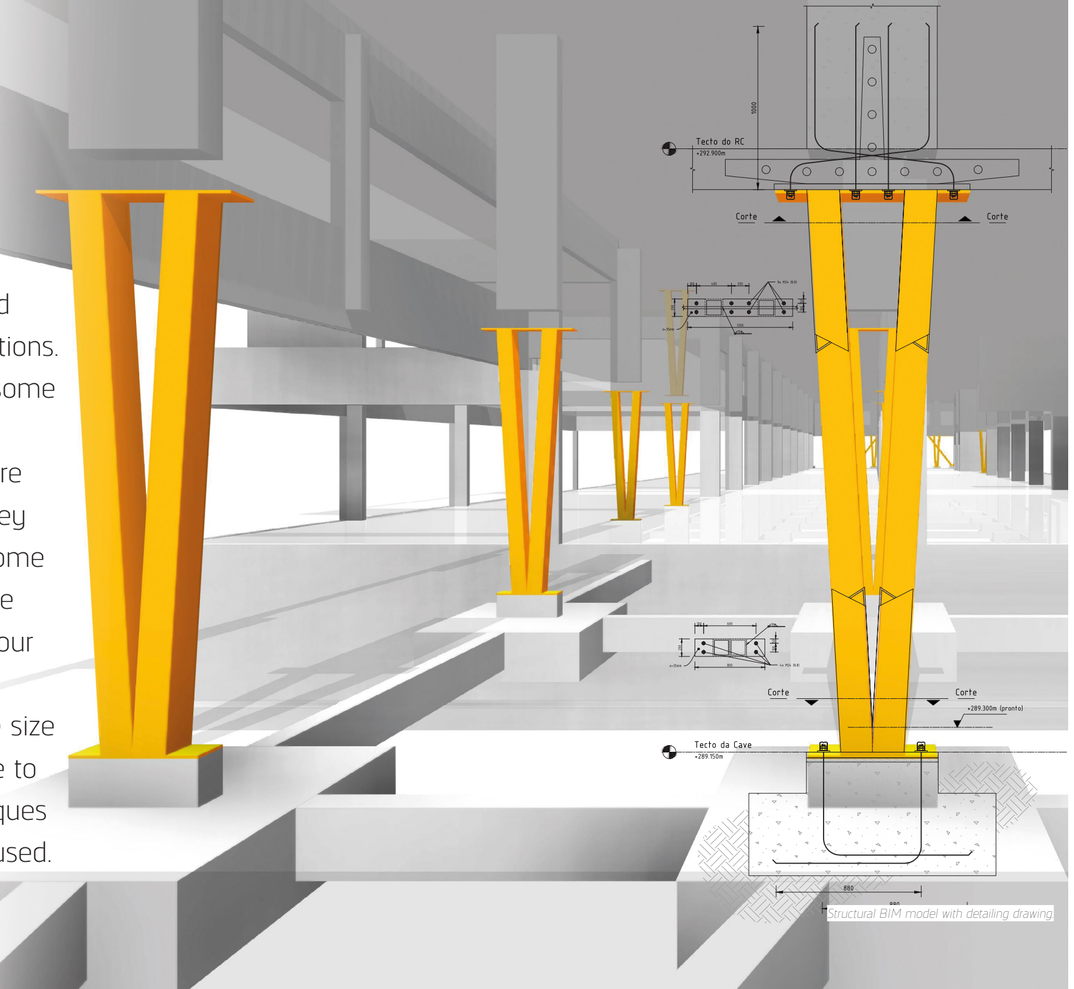
Projects and Other Ventures

mak • ing [mey-king] *noun* 1. the process of making or producing something. 2. (*makings*) the essential qualities needed for something.

Buildings

Buildings have, undoubtedly, been the most expressive man-made structures. Varying in shape, size, materials and functionality, buildings have, throughout time, symbolized the legacy of a civilization or a piece of history of mankind.

However, the progress in engineering, architecture and technology made us design buildings today far different from the ones before. The adoption of technologies, such as, BIM, parametric design and advanced software allows us to coordinate and orient our focus to more sustainable and optimized solutions. Following are some of the selected projects we were involved in. They represent, in some way that we are step ahead in our company, not because of the size or cost but due to the the techniques and methods used.



Structural BIM model with detailing drawing

Penafiel School Centre *Portugal*

JB Távora Architects

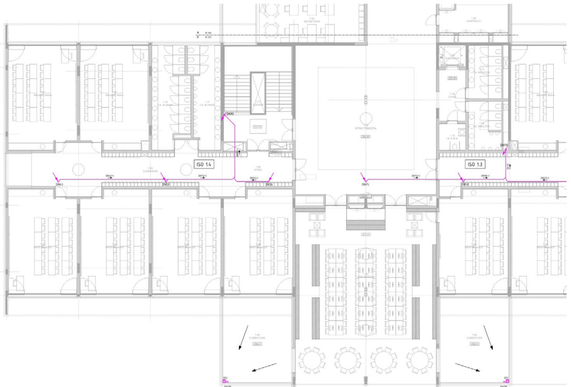
Located on the top of a wide valley, this 8000 square meter building benefits from an interesting landscape composition with good solar exposure. With accesses at different levels, the combination of shined regular concrete shapes with a set of dynamic V shape steel columns differentiates the volumes and integrates the structures in the spaces where they are visible.

The school centre, composed by a car park basement, two class room floors, a library and appending facilities, and also a sports pavilion, provides high standard conditions for the students.

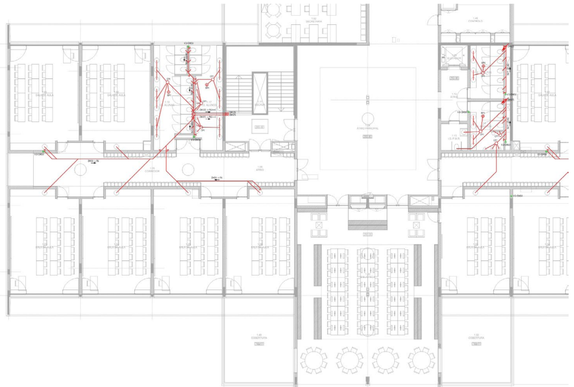
Due to floor height limitation, the structural design had to deal with all the imposed constraints, being these restrictions overcome without putting the safety at risk while respecting all the architectural requirements.

This project was done by using a waffle slabs to reduce unnecessary dead weight and customized steel beam with variable optimized sections, with heights greater than 350 millimeters, but never exceeding 650 millimeters, being able to span up to 24 meters. The duplication of vertical structure on the expansion joints was bypassed by the employment of a shear dowel system, taking advantage of the shear transfer from on side to the other whilst allowing each piece of the building to expand and contract without any restriction.

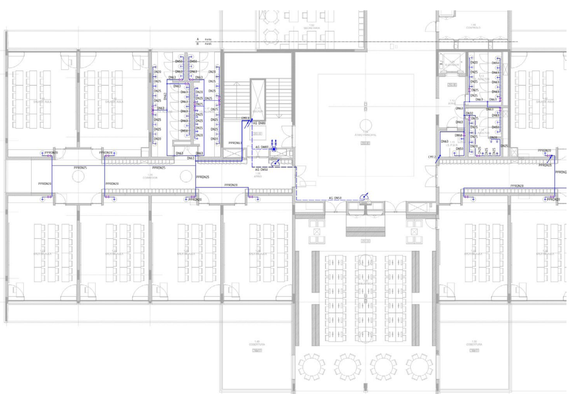
Consultancy and Design: Foundations / Structures / Water and Gas Supply / Wastewater and Stormwater Drainage / Fire Safety / Acoustic / Electricity and Telecommunications (partnership) / HVAC (partnership) / Solid Waste



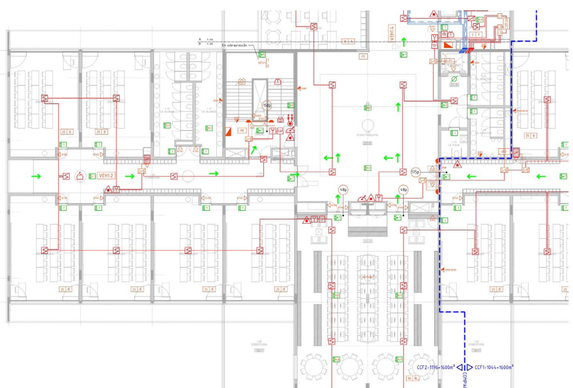
Example storm water drainage plan of one part of the building



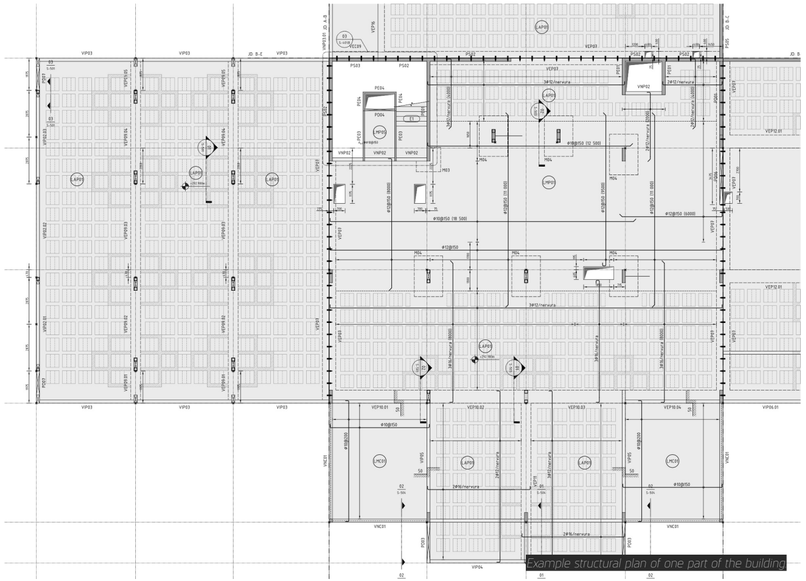
Example waste water drainage plan of one part of the building



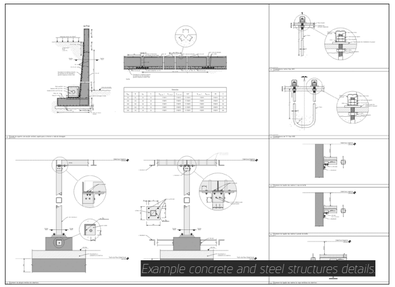
Example water supply plan of one part of the building



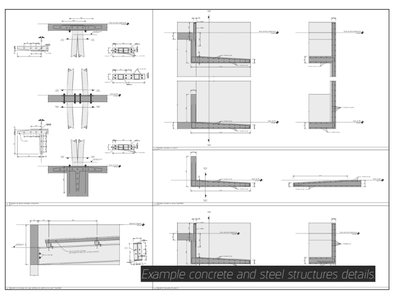
Example fire safety and protection plan of one part of the building



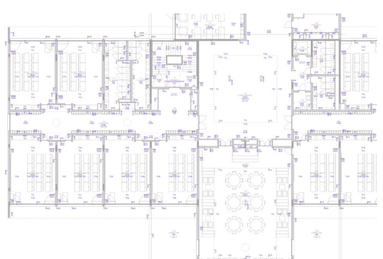
Example structural plan of one part of the building



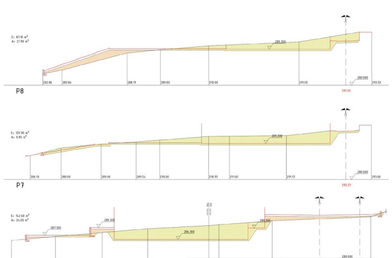
Example concrete and steel structures details



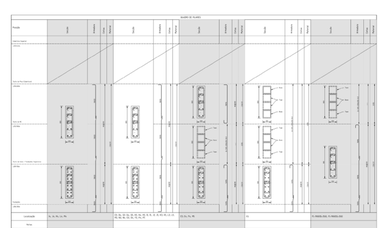
Example concrete and steel structures details



Example acoustic definitions plan of one part of the building



Gradding section of the building site



Example structural columns detailing

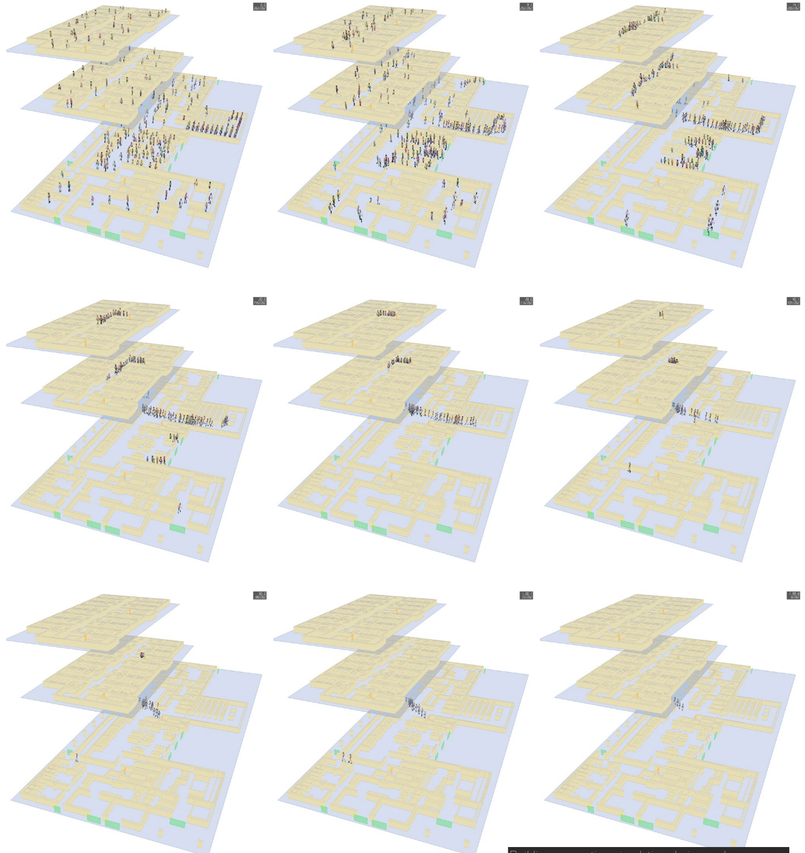
Football Campus Hotel
Angola

Miguel Cardoso Architects

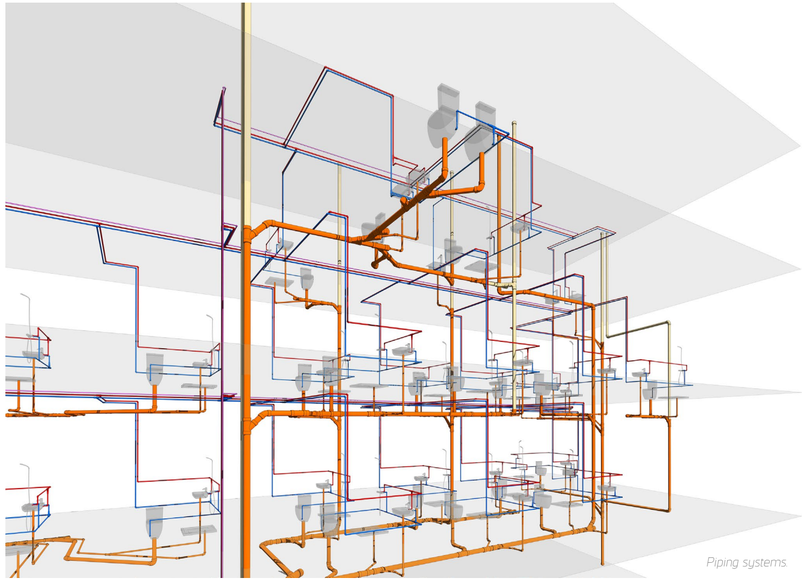
During the concept stage, as the layout progressed, it was evident that fire safety of this three story hotel for professional sport athletes could be a limitation of the design. To keep any hiccups away, detailed examination of the evacuation of the building was performed, so the occupants could exit the building safely and at the proper speed during an emergency.

Another important factor for the engineering team was to make the building fully autonomous from the external infrastructures since some of them were not immediately available and others are not fully operational all the time.

Consultancy and Design: Foundations / Structures / Water and Gas Supply / Wastewater and Stormwater Drainage and Treatment / Fire Safety / Electricity and Telecommunications (partnership) / HVAC (partnership)



Building evacuation simulation during and emergency



Piping systems.

Morro Bento Health Centre *Angola*

Miguel Cardoso Architects

A seven story medical building, comparable to a hospital, characterized by the strict coordination between the different MEP services due to its complexity, particularly the piping systems to support the clinical equipment and rooms.

Consultancy and Design: Foundations / Structures / Water and Gas Supply / Fire Safety / HVAC (partnership) / Wastewater and Stormwater Drainage and Treatment / Electricity and Telecommunications (partnership) / Special Systems (partnership)

BIM (BUILDING INFORMATION MODELING)

BIM IS AN INTELLIGENT MODEL-BASED PROCESS THAT PROVIDES INSIGHT TO HELP PLANNING, DESIGNING, CONSTRUCTING, AND MANAGING BUILDINGS AND INFRASTRUCTURES.

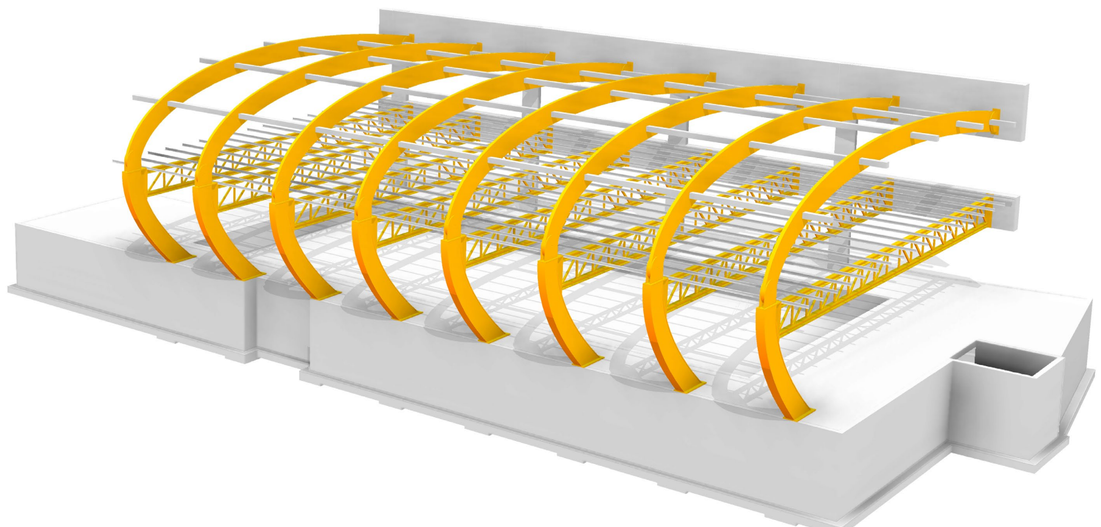
BY ESTABLISHING A BIM VISION, SUPPORTED BY PROCESSES AND WORKFLOWS, IT ALLOWS FOR INNOVATION ACROSS THE PROJECT, FOR MORE CREATIVE DESIGNS AND OPTIMIZED ENGINEERING SOLUTIONS. BIM PROVIDES THE RIGHT INFORMATION TO THE RIGHT PEOPLE AT THE RIGHT TIME.

Rosário College Sport Pool Building *Portugal*

Morais Soares Architects

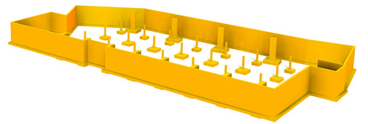
Composed by two volumes intersecting each other, this building distinguishes itself, not only because of the vaulted body where suspended swimming pool lies and the gym room above it, but also because of the use of different structural materials, as concrete, steel (curved columns and trusses) and wood (arched beams and roof), providing a captivate structural solution to be exposed.

Consultancy and Design: Foundations / Structures / Water and Gas Supply / Wastewater and Stormwater Drainage / Fire Safety / Thermal / Acoustic / Ventilation and Extraction

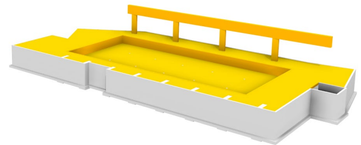


Complete structure of the pool section.

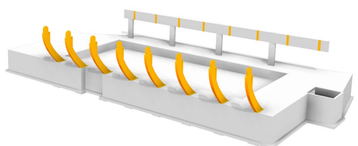
Staged construction evolution of the pool section.



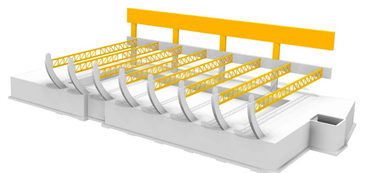
Construction of the foundations and basement structures.



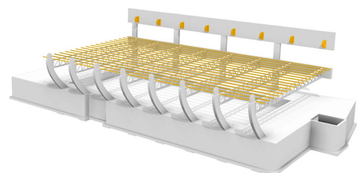
Construction of the pool ground floor slab and 1st floor supporting frame.



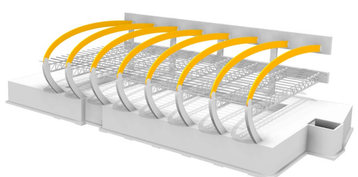
Assembly of the curved steel columns and the floor trusses supports.



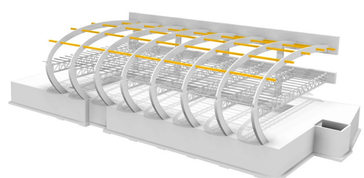
Assembly of the floor trusses and construction of the 2nd floor supporting frame.



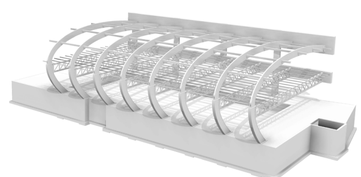
Assembly of the floor beams and the roof beams supports.



Assembly of the arched roof main wood beams.



Assembly of the roof secondary wood beams.



Complete structure of the pool section.

Aveleda Enoturism *Portugal*

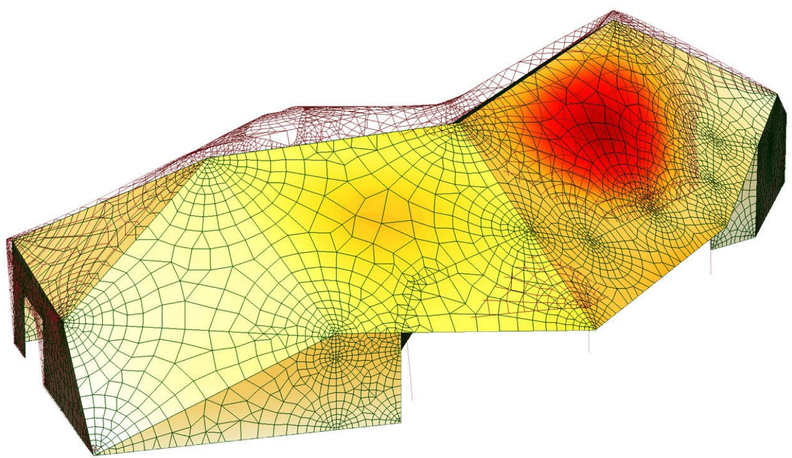
Morais Soares Architects

Despite the small scale of this geometrically complex shell of exposed concrete, this project primes for its sustainability and its landscape integration. A series of structural and thermal studies were made in order to comply with the architectural requirements and client needs, resulting in an economical building which is fully integrated with the environment.

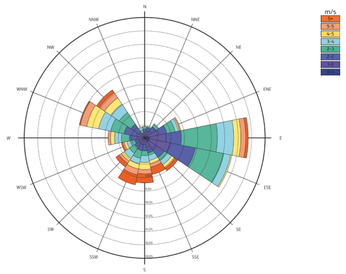
Consultancy and Design: Foundations / Structures / Water Supply / Wastewater and Stormwater Drainage / Fire Safety / Thermal / Acoustic / Ventilation and Extraction

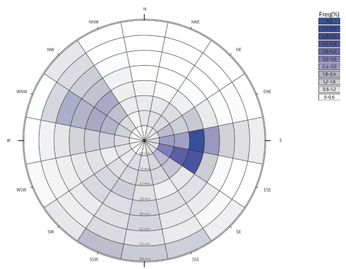
SEISMIC DESIGN

IS A SUBSET OF STRUCTURAL ANALYSIS AND THE CALCULATION OF THE RESPONSE OF A STRUCTURE TO EARTHQUAKES. IT IS PART OF THE PROCESS OF STRUCTURAL DESIGN, EARTHQUAKE ENGINEERING OR STRUCTURAL ASSESSMENT AND RETROFIT (IN REGIONS WHERE EARTHQUAKES ARE PREVALENT).

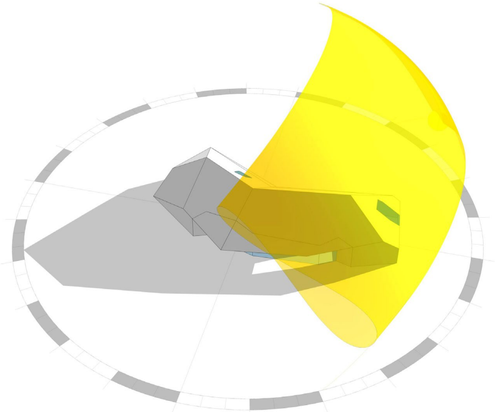


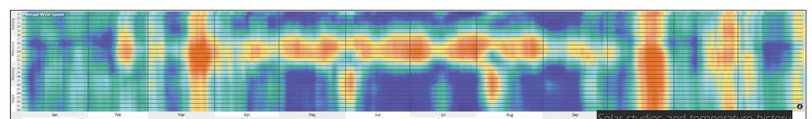
Deformation and results of the seismic analysis of the building.



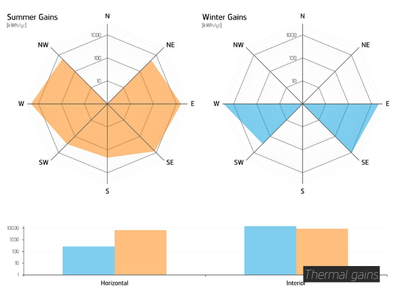


Wind data





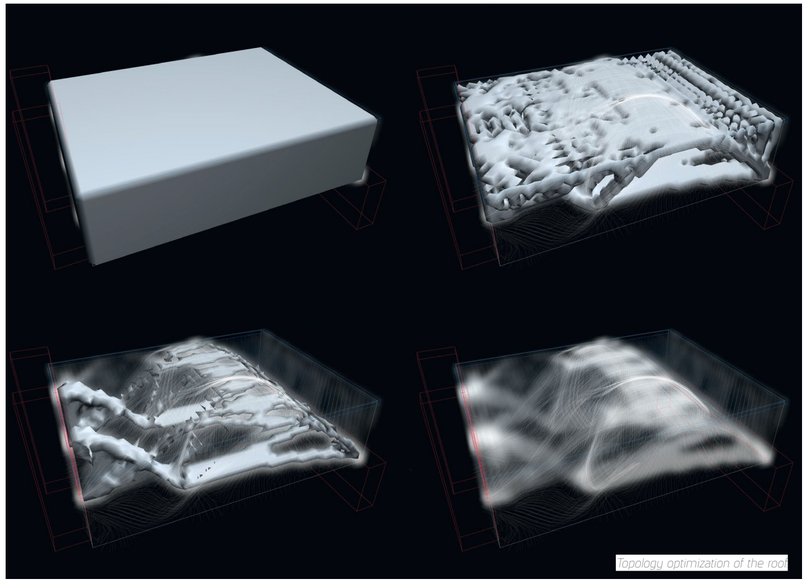
Solar studies and temperature history



Thermal gains

SUSTAINABLE AND PERFORMANCE ORIENTED DESIGN

THE PHILOSOPHY IS TO DESIGN SOMETHING COMPLYING WITH THE PRINCIPLES OF SOCIAL, ECONOMIC, AND ECOLOGICAL SUSTAINABILITY, ELIMINATING NEGATIVE ENVIRONMENTAL IMPACT COMPLETELY THROUGH SKILLFUL PERFORMANCE AND ORIENTED DESIGN, CREATING PROJECTS THAT ARE MEANINGFUL AND THAT CAN SHIFT BEHAVIOUR.



Topology optimization of the roof.

Amarante Theatre *Portugal*

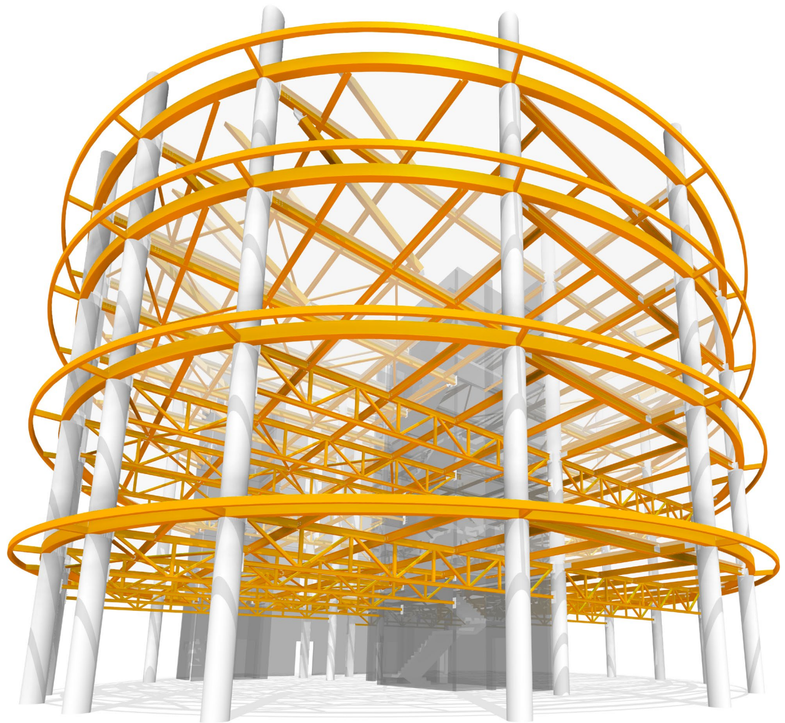
Bárbara Abreu & João Abreu Architects

The competition for the refurbishment of this splendid 50's theatre, right in the historical city centre, gave us the opportunity to hold new ventures during the concept stage, providing a combination of an historic piece of architecture with modern aesthetics without neglecting the intrinsic value of the building.

Consultancy and Design: Foundations / Structures / Water and Gas Supply / Wastewater and Stormwater Drainage / Acoustic / Fire Safety

TOPOLOGY OPTIMIZATION

TOPOLOGY OPTIMIZATION IS A MATHEMATICAL APPROACH THAT OPTIMIZES MATERIAL LAYOUT WITHIN A GIVEN DESIGN SPACE, FOR A GIVEN SET OF LOADS AND BOUNDARY CONDITIONS SO SUCH THAT THE RESULTING LAYOUT MEETS A PRESCRIBED SET OF PERFORMANCE TARGETS. USING TOPOLOGY OPTIMIZATION, ENGINEERS CAN FIND THE BEST CONCEPT DESIGN THAT MEETS THE DESIGN REQUIREMENTS.



Structural BIM model of one part of the building.

Radisson Hotel *São Tomé and Príncipe*

Urbis Architects

The more than 20 thousand square meters encompassing a large podium, a 12 story and a 7 story height buildings for a luxury hotel with 130 rooms and great facilities, combines distinct structural schemes with long spans and column free, allowing a plentiful open space on the bottom part of the main building and slim floors above. Such design permit MEP services to run freely throughout the building and letting the architectural team arrange the space unreservedly. The proximity to the beach and its high water level imposed the usage of a secant pile wall for the basements, due to the bedrock near the surface.

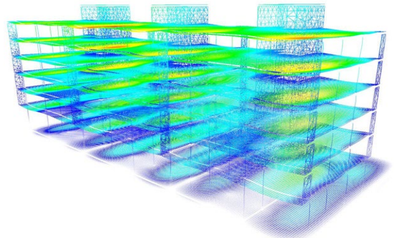
Consultancy and Design: Foundations / Structures / Water and Gas Supply / Wastewater and Stormwater Drainage and Treatment / Fire Safety

We not only look forward to going higher or deeper in new projects, we also want to find projects that force us to discover and apply new techniques giving them a modern answer and an opportunity to stand out.

We are pleased when we are part of a team which loves designing buildings because we know the desire to go to the next level will be endless.

Naval Club Complex of Luanda – Angola

Luxury housing complex in Maia – Portugal



Structural analysis of the Lobito mixed use building – Angola

Infrastructures

Defined as the basic physical and organizational structures and facilities needed for the operation of a society, infrastructures underlie the basic development of a nation.

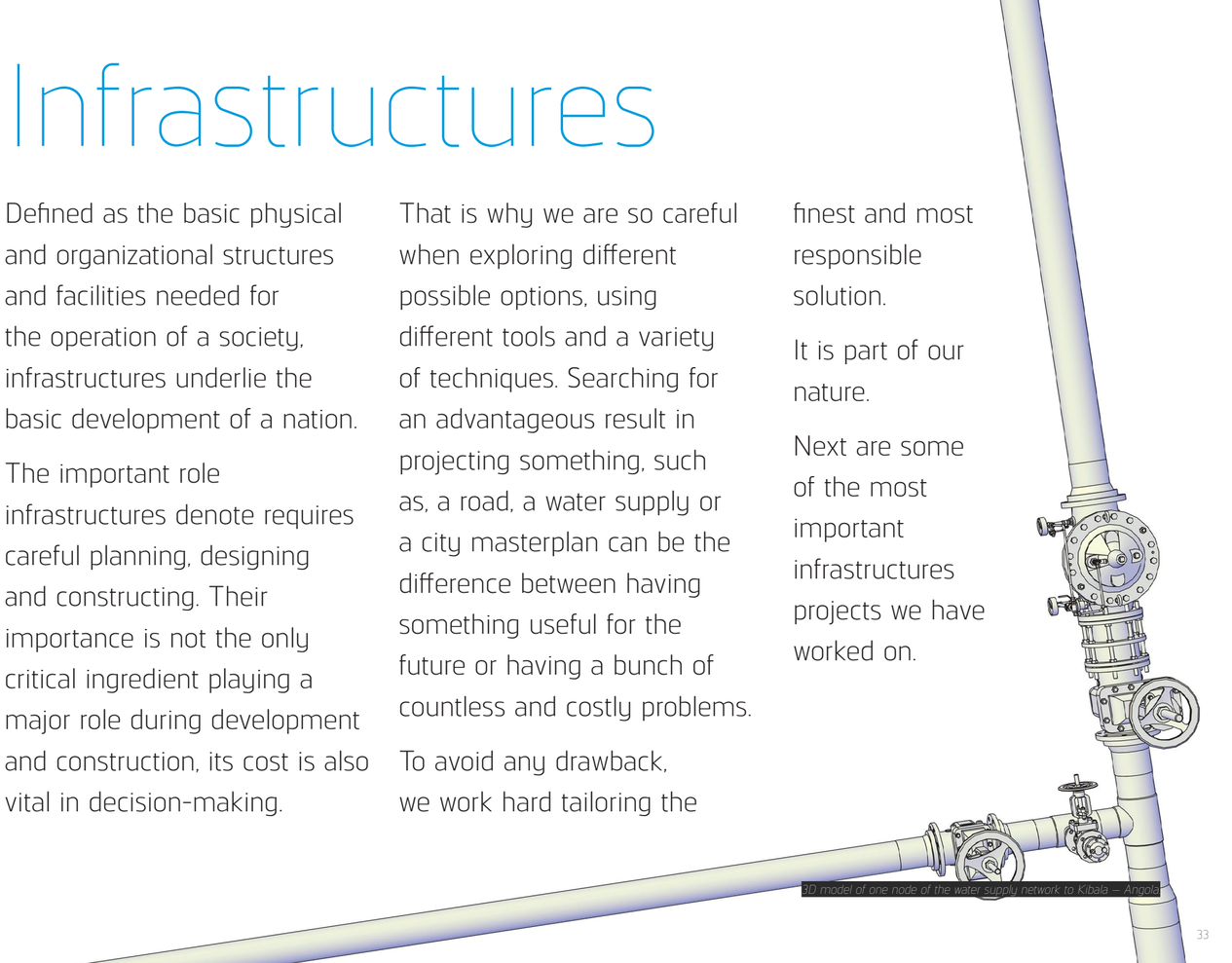
The important role infrastructures denote requires careful planning, designing and constructing. Their importance is not the only critical ingredient playing a major role during development and construction, its cost is also vital in decision-making.

That is why we are so careful when exploring different possible options, using different tools and a variety of techniques. Searching for an advantageous result in projecting something, such as, a road, a water supply or a city masterplan can be the difference between having something useful for the future or having a bunch of countless and costly problems.

To avoid any drawback, we work hard tailoring the finest and most responsible solution.

It is part of our nature.

Next are some of the most important infrastructures projects we have worked on.



3D model of one node of the water supply network to Kibala – Angola

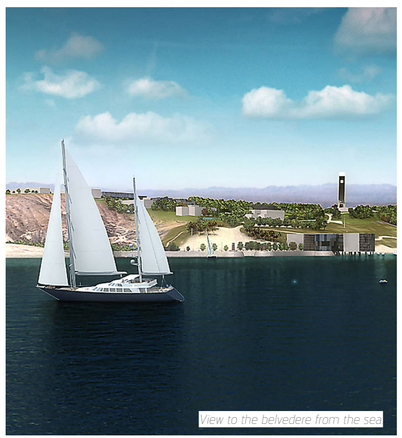
Benguela Blue Ocean *Angola*

Projek XXI
(authorship and coordination by Just An Architect – João Abreu Architect and co-authorship by Bárbara Abreu Architects)

More than 1300 hectares across 3 kilometers of the Atlantic coast are the base for the transformation into a new metropolitan city centre near the city of Benguela. Privileging the sea views, the central avenues branch out into various peripheral roads giving access to residential, commercial, mixed use, educational, cultural, medical, and other recreational and public facilities.

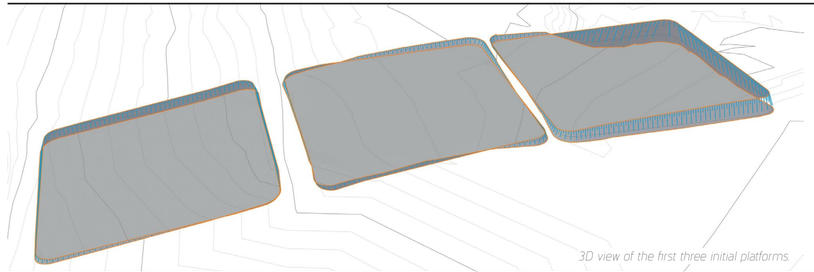
During this sensational project it was essential to carry out a careful examination of the landscape earthworks to accomplish a robust solution. The success of the result was due to a series of parametric trials, targeting the minimal earthwork volume, while preserving the landscape, the prescribed gradings and road profiles without causing any significant conflict with the drainage.

Consultancy and Design: Roads / Earthworks / Water Supply / Wastewater and Stormwater Drainage / Fire Safety

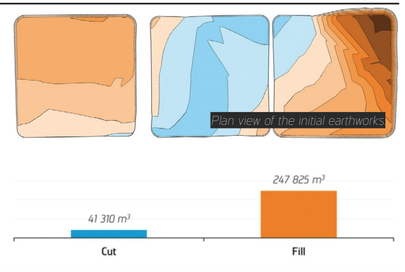


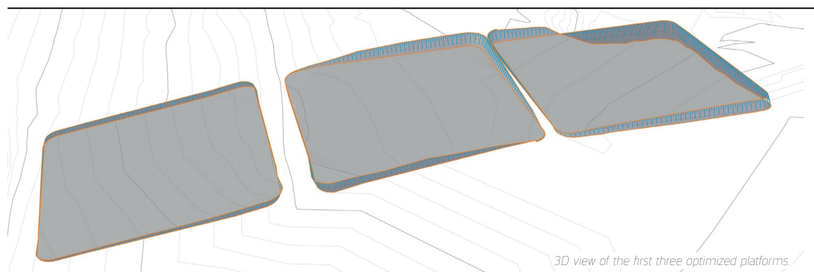
View to the belvedere from the sea

Masterplan

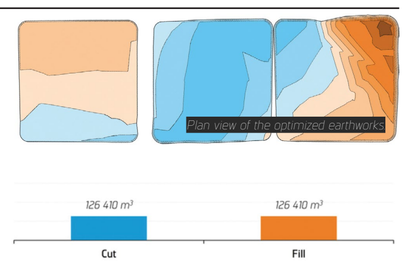


3D view of the first three initial platforms

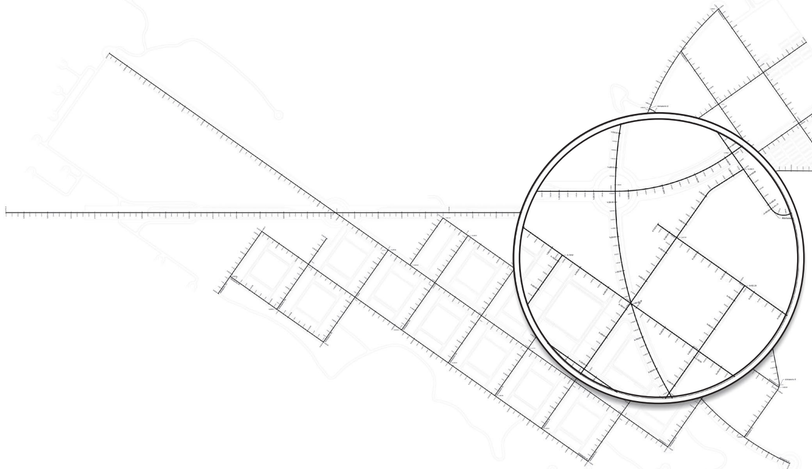




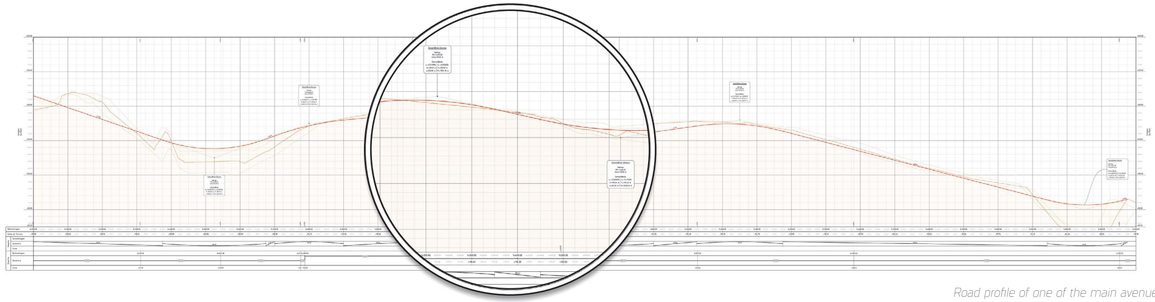
3D view of the first three optimized platforms



INITIAL SURFACE SHIFT	EARTHWORKS	NET VOLUME
-1,27	-15	-252 280
m	%	m³



Avenues and main roads layout



Road profile of one of the main avenues

Satellite image of the roads network earthworks

Kibala Water Supply Project

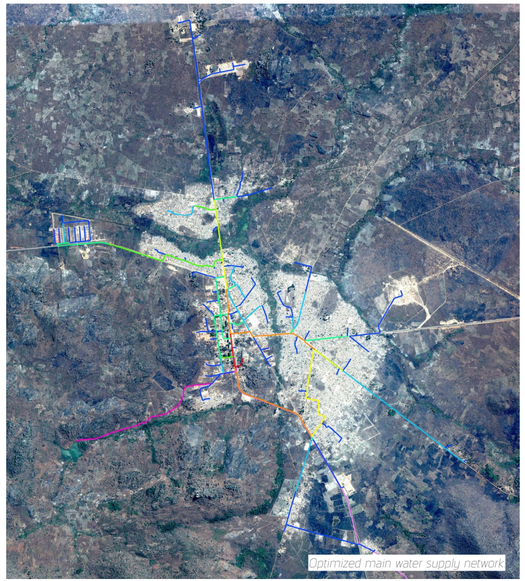
Angola

COGER

As part of a group of projects to supply water to almost half a million people in Angola, the Kibala project was the first we used as a prototype to establish and develop procedures and tools to assist the design stages, from water collection to distribution, including purification and storage, allowing us to test and analyze different solutions fast and opting for the most advantageous one.

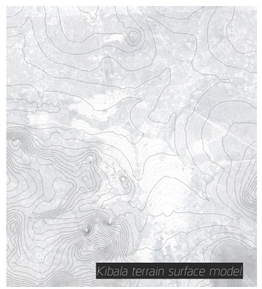
The proposed solutions – oriented to satisfy the demands during the period they were designed for, 10 or 20 years – adopt different types of works, perfectly achieving the objectives of the project.

Consultancy and Design: Hydraulics (Water Collection / Raw and Pure Mains / Treatment / Storage / Distribution / Connection) / Power, Telecommunications, Automation and Control (partnership) / Buildings

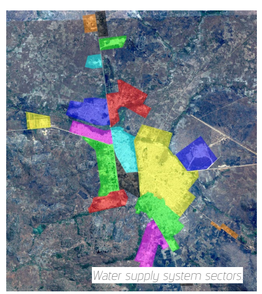


Optimized main water supply network

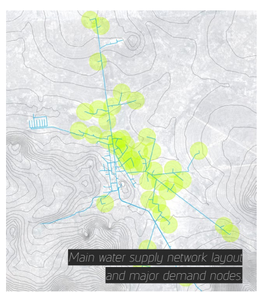
Kibala aerial view



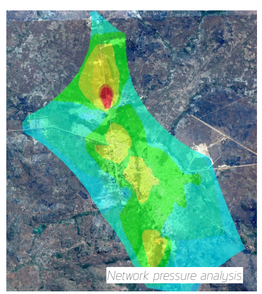
Kibala terrain surface model



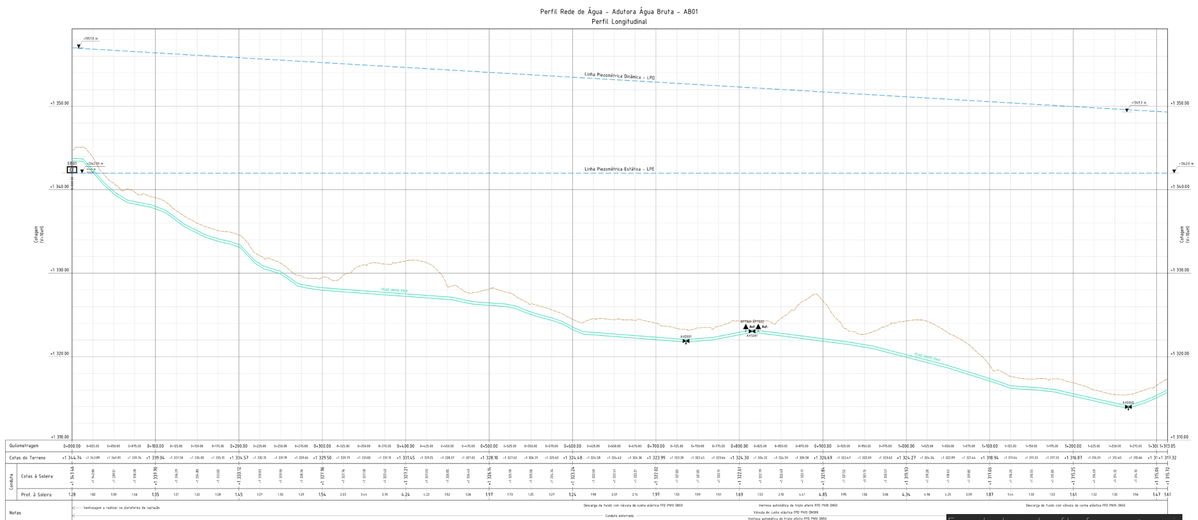
Water supply system sectors



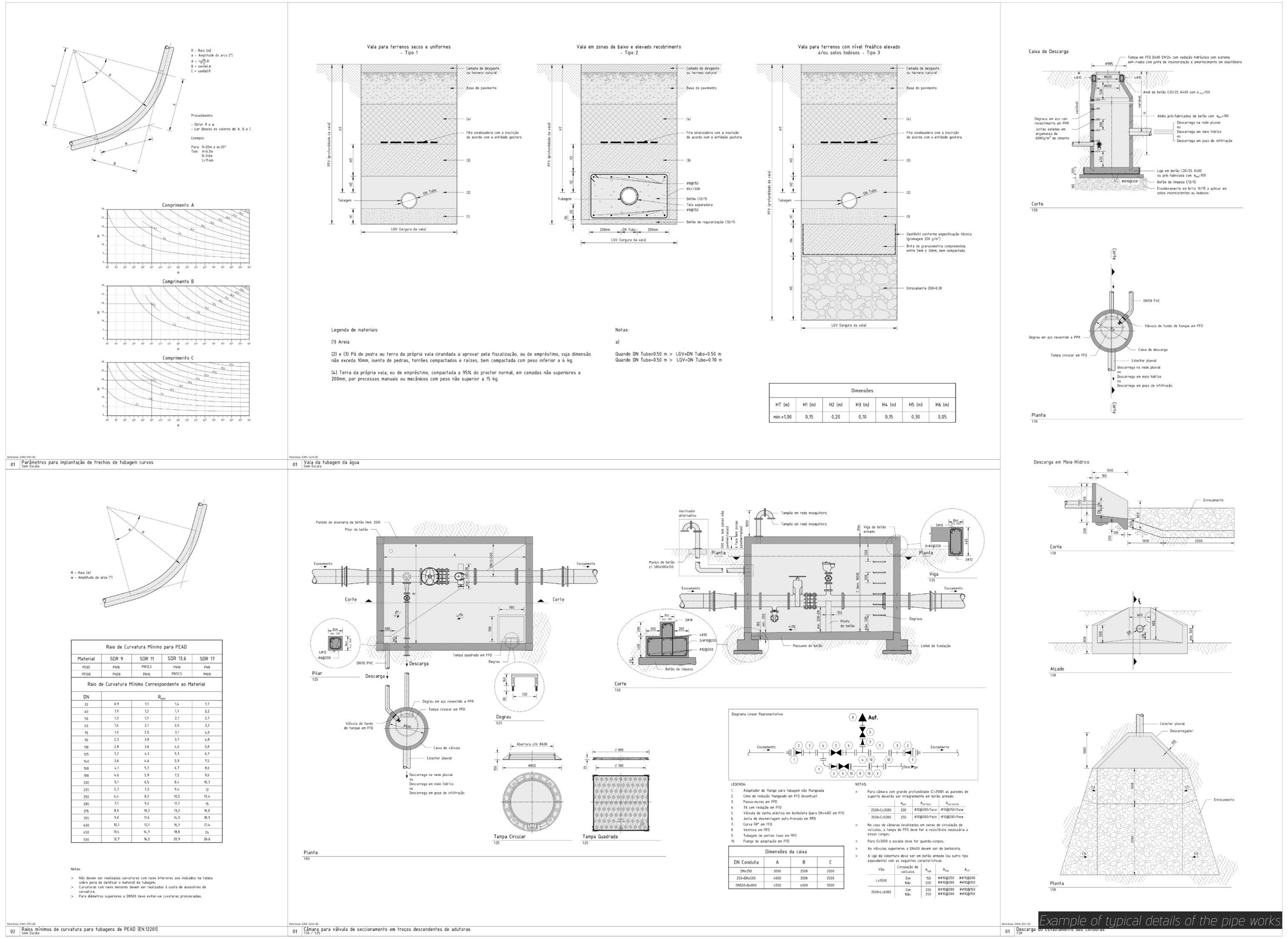
Main water supply network layout and major demand nodes



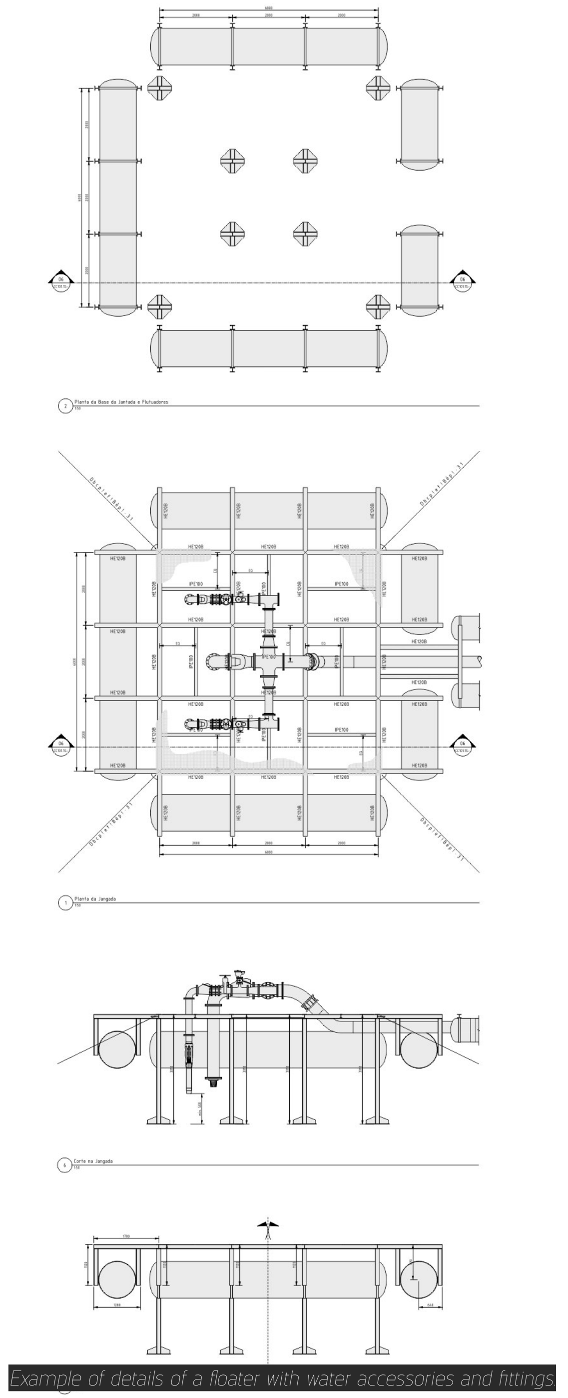
Network pressure analysis

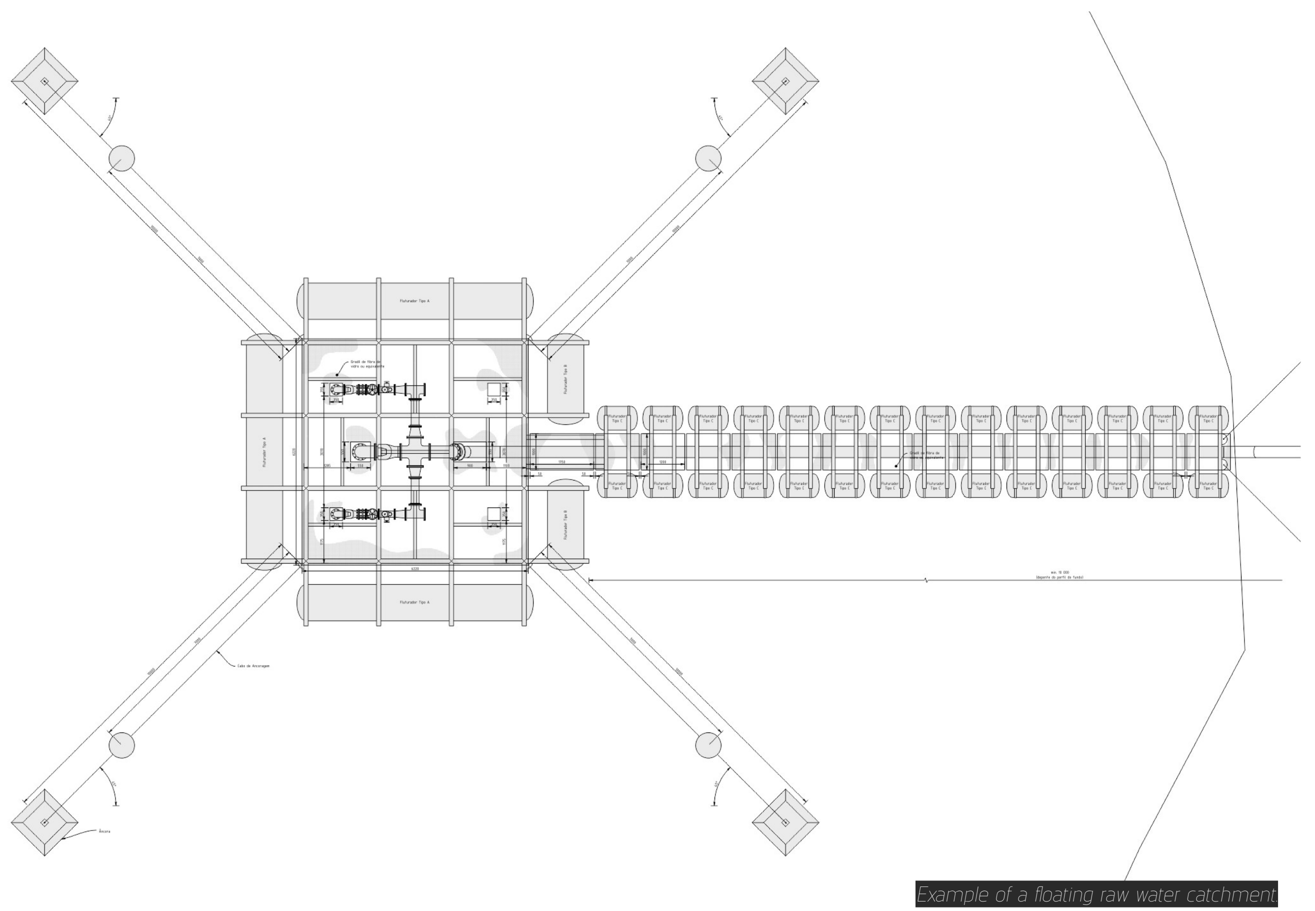


Example plan and profile of a raw water main



Example of typical details of the pipe works


Example of details of a floater with water accessories and fittings


Example of a floating raw water catchment


Example of a water network to a residential plot


Example of a partial water distribution network

Bom Jesus Resort *Angola*

Projek XXI
(authorship and coordination by João Ferros Architect)

Starting with clear ideas of preserving nature and highlighting the conservation of the baobab tree, valuing the organic urban mesh arrangement adapted to the terrain morphology, maintaining an attractive and panoramic view capable of providing a relaxing atmosphere, in combination with remote supporting services to executive business and companies.

Consultancy and Design: Roads / Earthworks / Wastewater and Stormwater Drainage / Water Supply / Fire Safety

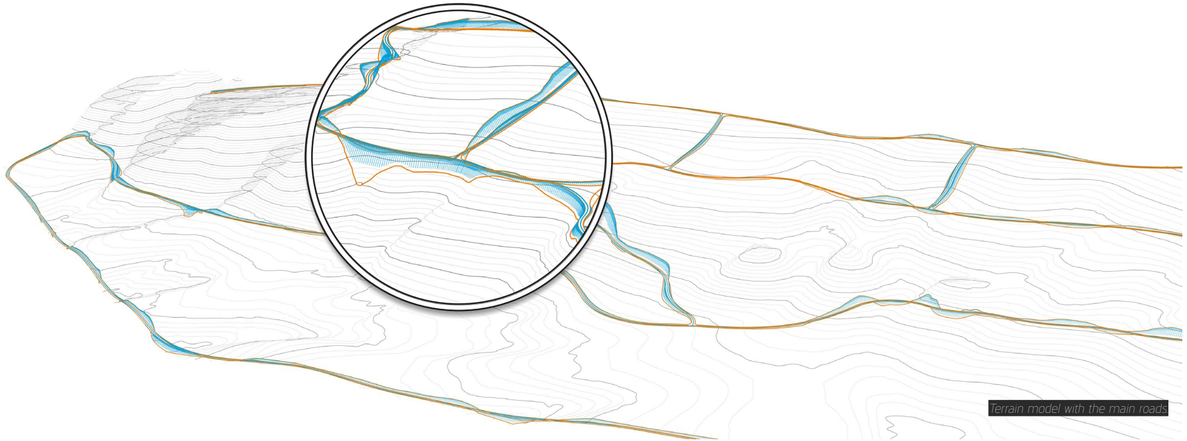
Model view

View from the hotel to the golf

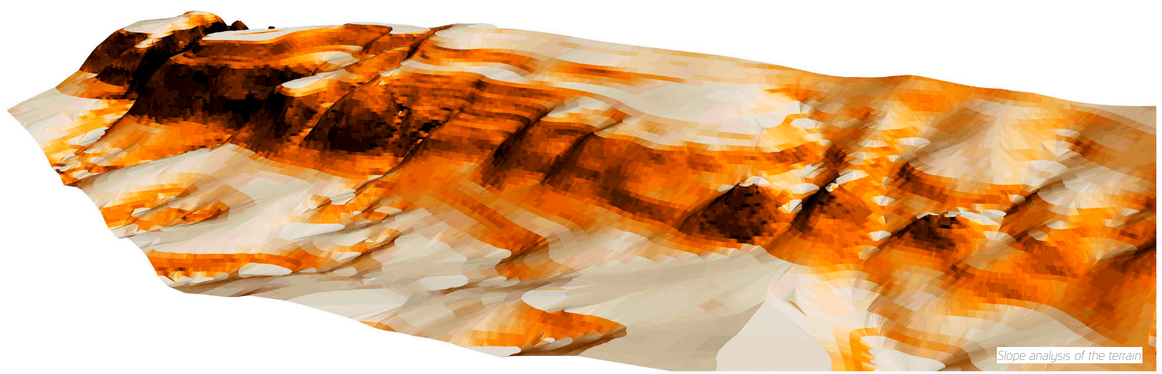
Masterplan

View to the residential buildings

Main hotel building



Terrain model with the main roads

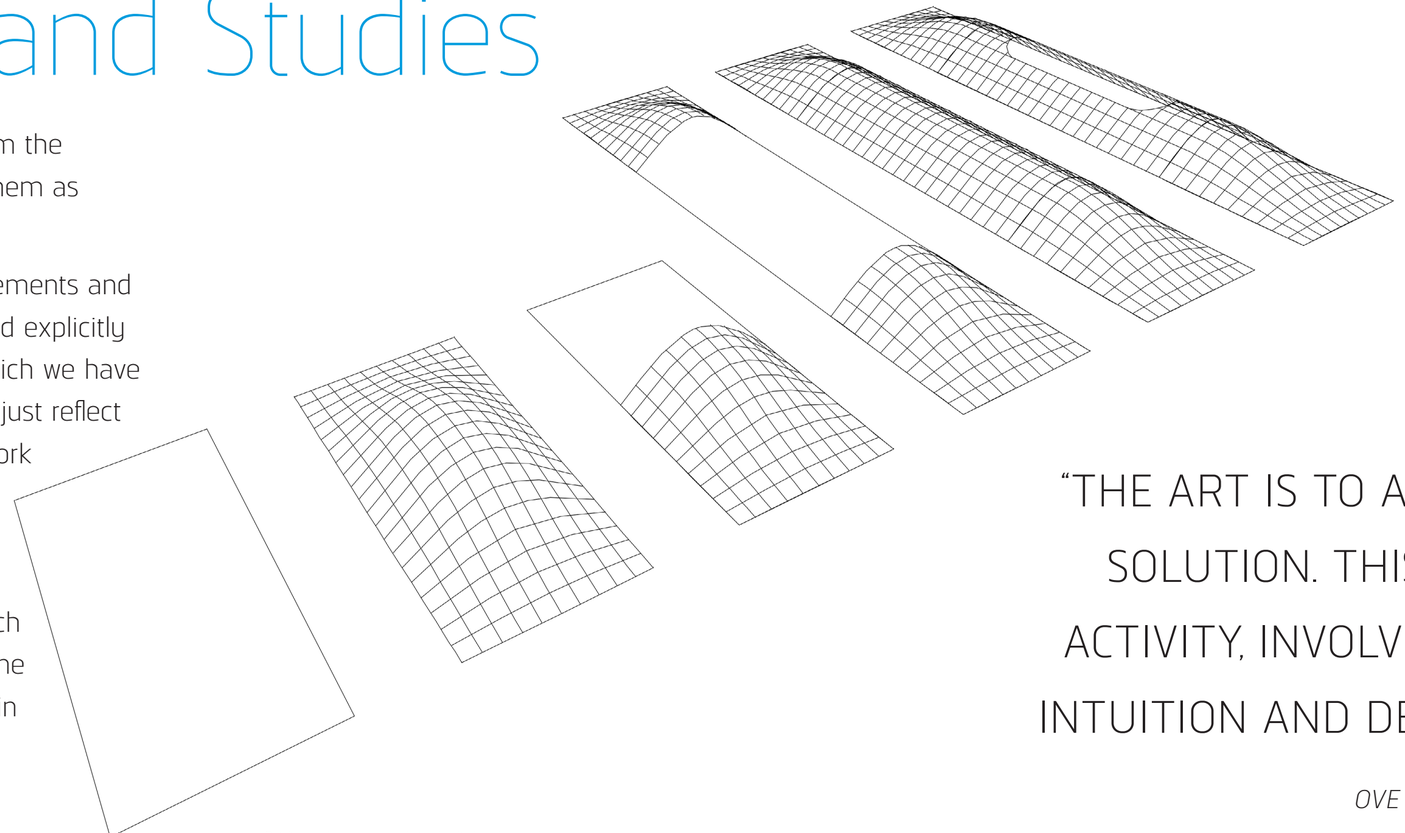


Slope analysis of the terrain

Experiments and Studies

Our job is not only to develop projects from A to B as an automated process. We also spend time experimenting and studying different alternatives, tools and methodologies. Many face such procedures as a waste of time, but we feel it to be something necessary to reach a balanced solution. This is why it is important to be part of the creative process. We can provide engineering inputs to the projects during its development, help architects and designers to create smart buildings, by allying architecture and engineering from the start and not treat them as independent fields.

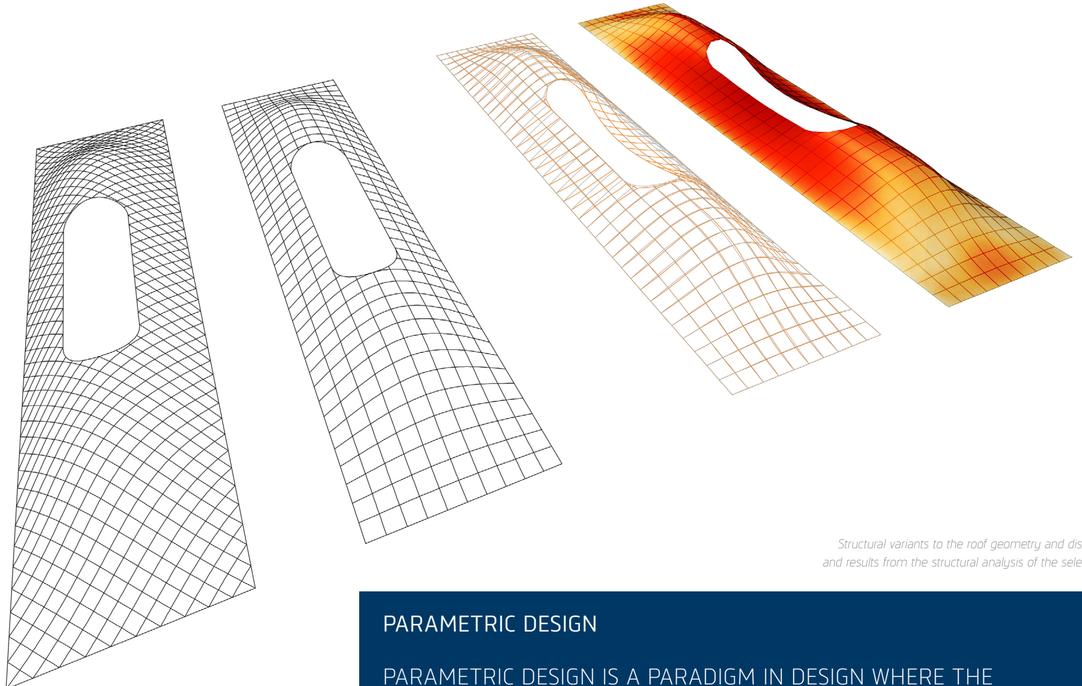
Many of our achievements and work are not exposed explicitly in the projects in which we have been a part of, they just reflect a fragment of the work done, but that is not a problem to us, because the added internal value is much more worthy than one could have thought in the beginning.



Building roof geometry evolution (undisclosed project)

"THE ART IS TO ARRIVE AT A GOOD SOLUTION. THIS IS A CREATIVE ACTIVITY, INVOLVING IMAGINATION, INTUITION AND DELIBERATE CHOICE."

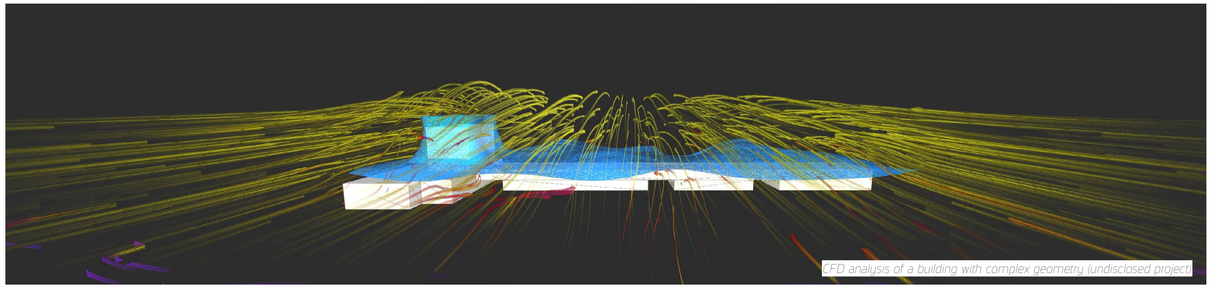
OVE ARUP



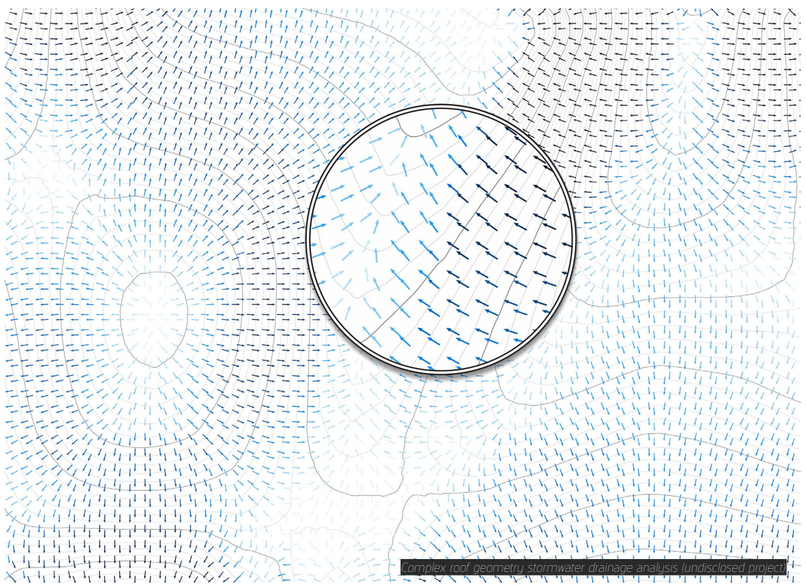
Structural variants to the roof geometry and displacements and results from the structural analysis of the selected model

PARAMETRIC DESIGN

PARAMETRIC DESIGN IS A PARADIGM IN DESIGN WHERE THE RELATIONSHIP BETWEEN ELEMENTS ARE USED TO MANIPULATE AND INFORM THE DESIGN BASED ON ALGORITHMIC THINKING THAT CLARIFIES THE RELATIONSHIP BETWEEN DESIGN INTENT AND DESIGN RESPONSE.



CFD analysis of a building with complex geometry (undisclosed project)



Complex roof geometry stormwater drainage analysis (undisclosed project)

COMPUTATIONAL FLUID DYNAMICS (CFD) ANALYSIS

CFD IS THE STUDY OF INTERACTION OF LIQUIDS AND GASES WITH SURFACES DEFINED BY BOUNDARY CONDITIONS USUALLY USING COMPUTERS TO PERFORM THE ANALYSIS.

AN IMPORTANT USAGE OF THIS TECHNOLOGY IS TO ASSESS THE AIRFLOW AROUND BUILDING SITES AND BUILDING FORMS.

ITERATIONS

Trials and Errors: Answers

it • er • a • tion [it-*uh*-rey-sh*uh* n] *noun* 1. the process of doing something again and again, usually to improve it, or one of the times you do it.

Findings

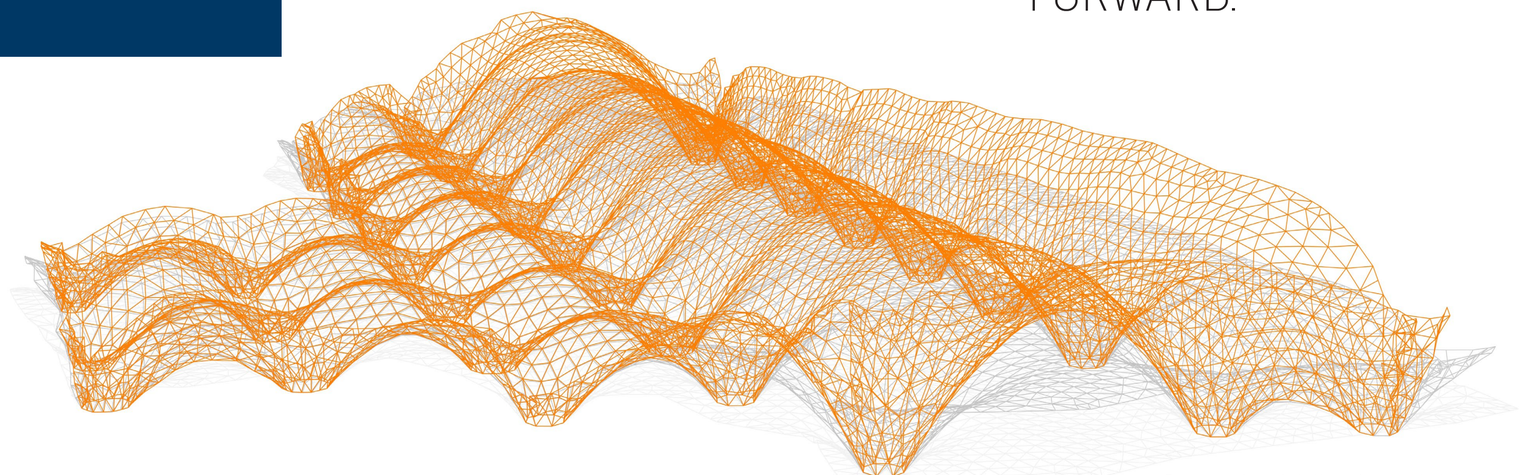
Regardless of our experience, we feel we learn new things everyday. The truth is that not everything we do for the first time goes smoothly and without errors. In reality, thanks to those hitches, we learn much more and stumble on other ideas and findings.

Engineering is like that, it is experimenting. We could simply say it is nothing more than a combination of a variety of learning and experiences that, together, allow us to move forward. Not being afraid to fail allows us to learn. Needless to say, we do our best to finish off with a polished result. But all this is only possible if we are conscious of the *dos and don'ts* learnt.

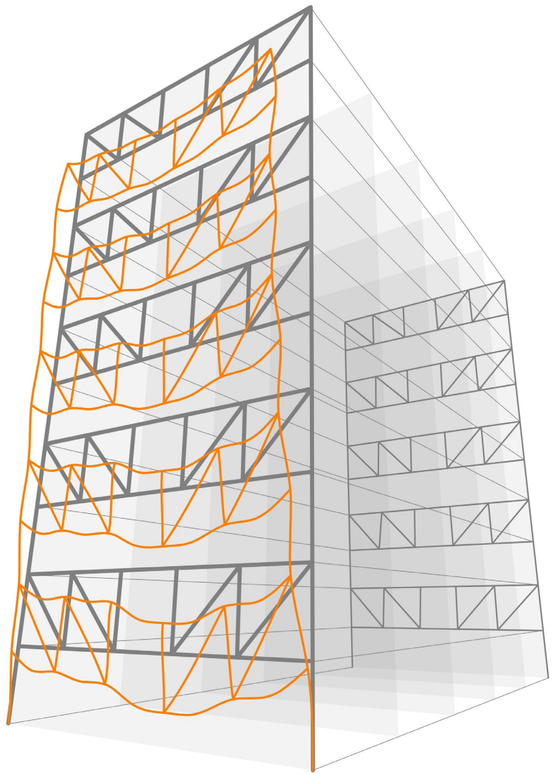
SMART GEOMETRY: FORM FINDING

FORM-FINDING IS ONE OF THE STRATEGIES TO IMPLEMENT PARAMETRIC DESIGN. THE IDEA BEHIND IT IS TO OPTIMIZE CERTAIN DESIGN GOALS AGAINST A SET OF DESIGN CONSTRAINTS USING NUMERICAL METHODS TO FIND NOVEL SOLUTION FOR COMPLEX PROBLEMS.

ENGINEERING (...) IS NOTHING MORE THAN A COMBINATION OF A VARIETY OF LEARNING AND EXPERIENCES THAT, TOGETHER, ALLOW US TO MOVE FORWARD.



Parametric evolution of a building roof geometry (undisclosed project).



Buckling results of the main frames of an office building in Luanda – Angola

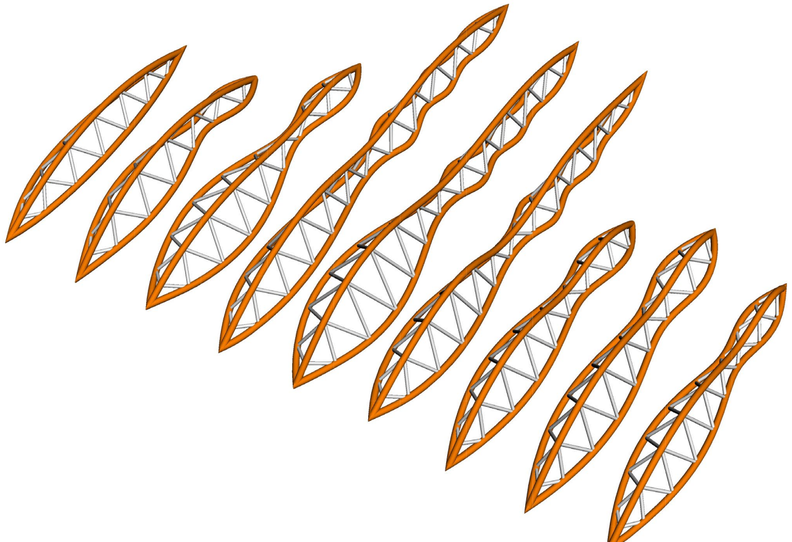
Creating and developing audacious engineering projects is truly challenging. It is constantly defying the rules of nature.

Without having a perfect understanding of physics and the know-how to carry complex simulation analysis of buildings and infrastructures in severe and extreme scenarios, it is not possible to ensure a new step, even with strong will. Natural forces will just not allowed it.

Fortunately the tools available nowadays supply a powerful way to detail and materialize almost everything. From complex geometries of organic roof shapes to twisted terrain surfaces, it is possible to do everything. However, even with growing technologies like 3D printing, an accurate study and understanding of geometry is the key to creating something unique within the budget. Mastering patterning and paneling are just some of the fundamental techniques.

DIGITAL MODELING AND FABRICATION

USING ADVANCED SOFTWARE IT IS POSSIBLE TO CREATE 3D MODELS AND SIMULATE AND TEST A VARIETY OF EVENTS GIVING ROOM FOR ITERATIONS AT A LOW COST. IT IS EVEN POSSIBLE TO CONSTRUCT THESE MODELS USING ADDICTIVE (3D PRINTERS) OR SUBTRACTIVE (CNC, LASER CUTTERS) MANUFACTURING PROCESSES PROVIDING A REAL FEEL AND POSSIBILITY TO RUN AUTHENTIC TESTS, ALLOWING ADJUSTMENTS OF ANYTHING BEFORE GOING TO THE FINAL CONSTRUCTION IN A LARGER SCALE.



3D models of parametric studies to space trusses (undisclosed project)

Looking Forward

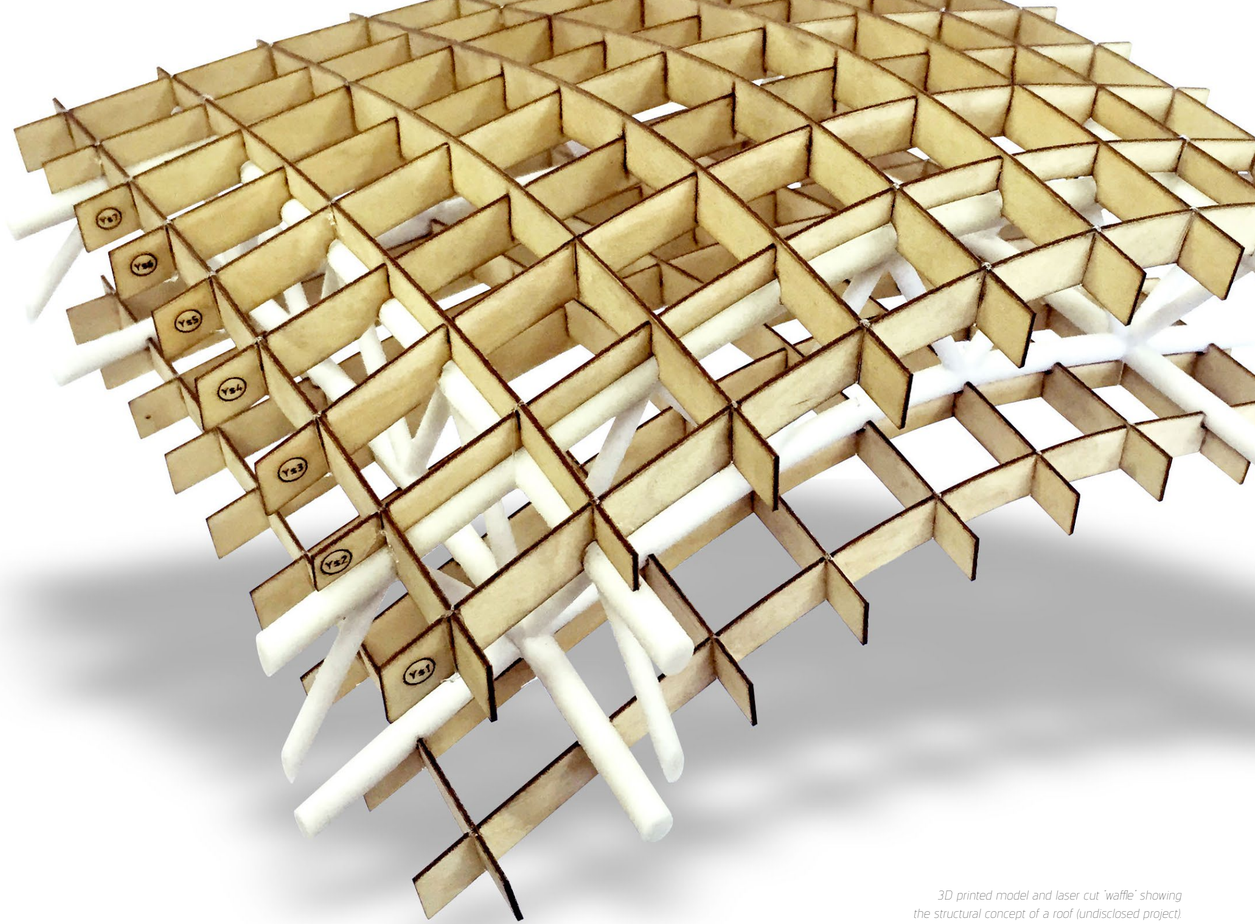
We look forward to having the opportunity to work with amazing people, the ones who reveal an intense desire of change and obsession to excellence, on remarkable project not only by its size or cost, but especially by its ingenious essence. For these reasons, we put all our energy, expertise and passion, hoping to help our client to achieve their strong aspirations, even if we have to take risks or to leave our comfort zone, because we also aspire to reach the next level.

exp(LAIII)Lab

EXPERIMENTAL LABORATORY

EXPERIMENTAL LABORATORY

AS PART OF OUR STRATEGY TO EMBRACE THE FUTURE IN CREATION, ANALYSIS, DESIGN AND CONSTRUCTION, FOLLOWING OUR VISION, WE HAVE CREATED A BRANCH TO DEAL WITH INSANE PROJECTS THAT ARE SEEN AS UTOPIAN TODAY, BUT TURNED INTO REALITY TOMORROW. FOR THIS, WE THOUGHT THAT NO BETTER NAME THAN: EXPERIMENTAL LABORATORY WOULD REFLECT EXACTLY WHAT WE WANT IT TO BE. WE REALLY HOPE THIS VENTURE ENGAGES OTHERS TO ALSO EXPLORE IDEAS AND THINK OUTSIDE THE BOX. WE ARE EXTREMELY OPTIMISTIC ABOUT THIS!



3D printed model and laser cut 'waffle' showing the structural concept of a roof (undisclosed project).

PS

Credits and Further Words

P • S *noun* 1. an additional remark at the end of a letter or email.
2. an extra piece of information.

Special Thanks

We would like to thank all our present clients for accepting the invitation to work with us, trusting our work and giving us the motivation to improve every day.

We wish to share our enthusiasm with future clients, valuing the change they could provide us, by offering them our contribution with our services and determination to provide excellence.

"EVERY ACCOMPLISHMENT STARTS WITH THE DECISION TO TRY."

GAIL DEVERS

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Cover Image and Back Cover
Kibala Terrain Model (Angola)

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RGB

WE LIVE INSPIRED BY DREAMS,
HOWEVER, IT IS WITH REALISM THAT
WE MAKE DECISIONS.

WE KNOW THE WILL WE HAVE IS THE
BEST REASON OF ALL TO LOOK FOR
NEW CHALLENGES.

ALWAYS!

looking for new challenges.

everyday.