



YOUR INTERNATIONAL PARTNER FOR

CONCEPT STYLING



COLOUR & TRIM



MODELING



VIDEO



PROTOTYPING



PRODUCTION
ENGINEERING



W W W . F D - G R O U P . E U

COMPANY

F.D. GROUP's technical office, located in Borgo Panigale, intends to provide engineering support to mechanical companies and alike. It is composed by five divisions among which:

**DESIGN Division**

The Company proposes to its customers Innovation & Creativity, carrying out all the project phases from the concept creation to its generation, until the prototype achievement. Our team is composed also by international professionals, who allow us a continuous trend and a global languages updating. Research, creation and planning are our big challenges for transforming our research results into creativity, moving from a material product (i.e. a car or a remote control) to the creation of intangible services (i.e. video editing and graphic design).

**ENGINEERING Division**

It is specialized in cold-working manufacturing, automation, plant design and in all the activities which concur, broadly speaking, to machines, prototypes and plant design construction. It deals with planning and industrialization of plastic products and of stamping process simulation. The planning implementation takes place in close cooperation with the customer, in order to achieve a personalized result and appropriate to his needs, both under a functional and an aesthetic point of view.

Flexible solutions for any business need

SOFTWARE

The use of tridimensional design instruments and of planning management softwares allows us an excellent interface with the customer in order to reduce at minimum the uncertain results leaving a small amount of room for hindrances or problems in the after-planning phases. Our office uses for its plans, drafts and realizations the most modern technologies and software.

MORE EFFICIENCY

A further service offered by the studio is the possibility of making inspections at the customer's headquarters both during the preliminary phases of the design, for taking the correct route, and in its following phases so that they can see the work done with their own eyes and optimize possible monitoring unforeseen difficulties.





The train design is one of the most demanding above all for the infrastructural constraints, the weight, the dimensions, the need to guarantee the greatest performance respecting precise characteristics and limits. We are convinced that technology might be used to simplify the duties carried out in our daily life, making it more pleasant.

RAIL TRANSPORT

F.D. GROUP participates to the planning and realization of external and internal which comprises the creation of innovative furniture for trains which includes the passenger's railcar and the wagon-lit, the restaurant up to undergrounds.

Our designers are very accurate in creating the passengers' ergonomic comfort, by studying spaces, materials and colors which increases the well-being within the framework of the transportation compartment. The rail transportation design becomes today a central element in the communication process for attracting and involving customers, offering them an emotional experience on the comfort standard.

For creating new travel styles we concentrate our attention on:

- Internal spaces
- Technological materials
- Seat ergonomics
- Lighting
- Truck spaces
- Information and connectivity systems

Internally **F.D. GROUP** takes advantages of specific teams for any job, so to respond to the various needs supplying skilled staff.

Exterior Design

Our company works to the engine and railcar generation, according to the current legislation regarding ergonomics, aerodynamics, security, setting and optimizing the shape for prototyping and mass-production.

Interior Design

Our company works to the cabin and internal setting, by choosing the most suitable materials and shapes according to the current legislation regarding ergonomics, aerodynamics, security, setting and optimizing the shape for prototyping and mass-production.

Color and Trim Design

Our company works in very close contact with Interior and Exterior teams, it deals with sensorial perception creation, through colors, lights, tactile and olfactory sensations studies of the employed materials.

Prototyping

It takes advantage of the most innovative materials and industrial processes, in order to create functioning prototypes or exclusively aesthetic, according to the customer's needs.





BOATS

F.D. GROUP takes part to the success in the wide Italian navigation tradition, conceiving innovative and functional solutions, richly trimmed, modernly equipped, evocating an infinitive charm linked to the concept of elegance and sportsmanship. Our professionals, using the new materials, create curvy shapes which instill an idea of stylish power, combining the traditional appeal of wood to the modernity of the most innovative composite materials.

Internally **F.D. GROUP** takes advantages of specific teams for any job area, so to respond to the various needs supplying skilled staff.

DESIGN TEAM:

Exterior Design

Our company works to boat production, of its external parts, according to the current legislation regarding ergonomics, aerodynamics, security, setting and optimizing the shape for prototyping and mass-production.

Interior Design

Our company works to the cabin and internal setting, by choosing the most suitable materials and shapes according to the current legislation regarding ergonomics, aerodynamics, security, setting and optimizing the shape for prototyping and mass-production.

Color and Trim Design

Our company works in very close contact with Interior and Exterior teams, it deals with sensorial perception creation, through colors, lights, tactile and olfactory sensations studies of the employed materials.

Prototyping

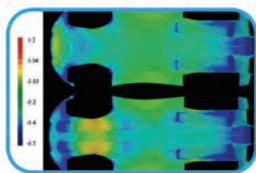
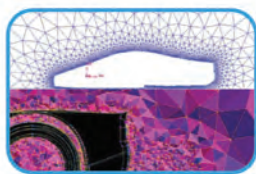
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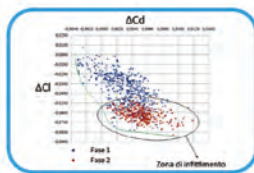


AERODYNAMICS E STRUCTURES

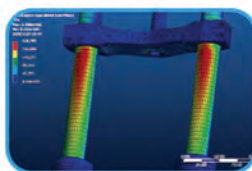
COMPUTATIONAL FLUID DYNAMICS



AERODYNAMICS MAXIMIZATION

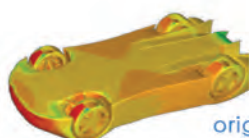
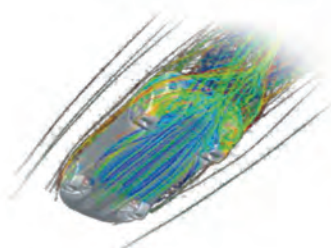


STRUCTURES

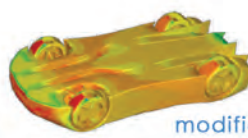


F.D. GROUP allows accurate superficial and volumetric mesh followed by Fluid-dynamics analysis and intense Post-Processing phases.

Multi target maximizations with genetic algorithms (MOGA II).
FEM analysis and structural maximization.



original



modified



USED TOOLS

Structural Mechanical Analysis (FEM)

- ANSYS Mechanical
- PATRAN and NASTRAN
- HYPERMESH
- OPTISTRUCT
- RADIOSS
- COSMOS
- NASGRO V4

CFD

- FLUENT

CAD

- CATIA V4
- CATIA V5
- FiberSim for composite Design
- SOLIDWORKS
- PRO ENGINEER
- UNIGRAPHICS

AEROSPACE

F. D. GROUP supplies innovative answers to the technological and industrial challenges in the Aerospace field. Thanks to the technical assistance of the "on-site" design, **F. D. GROUP** offers a wide range of engineering solutions in order to satisfy the current demanding challenges. As external suppliers we provide support during the whole production cycle and we offer combined and multidisciplinary working groups.

KNOW-HOW

- Design and integration of structures, systems and components
- Compound Design
- Digital Prototyping
- Modeling
- Acoustics, aerodynamics
- Material science
- Tooling

STRESS ANALYSIS SERVICES:

Structural analysis

- Analysis Report
- Finished Elements Modeling (FEM)
- FEM documents updating
- FEM data characteristics
- Supporting technical documents
- Design assistance
- Breakdown analysis
- Structural shaping
- Components and structures stress
- Material selection assistance
- Nondestructive control

Data and weights management

- Structural planning (Drawing set architecture)
- Configuration management: changes and implementation fulfillment in the structural planning and drawing set.

DESIGN SERVICES:

MFG preparation

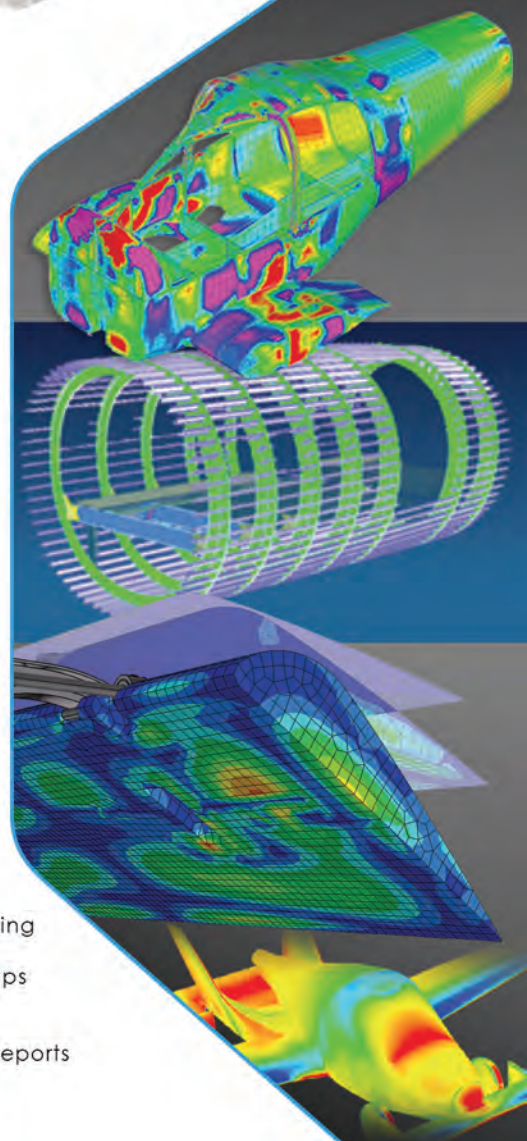
- MFG file preparation
- 3D solid mock-ups
- 2D listed drawings
- Assembled parts list
- Flat mock-ups for the sections produced
- Lay-up for the composed sections using dedicated software
- Interface design and frontier mock-ups preparation
- Structural design definition
- Weight force control and technical reports

Mock-Up geometrical connections

- 3D solid mock-ups

Validation test

- Support to the measures deformation preparation
- Equipment installation for flight test
- File definition support for the flight test equipment installation





AUTOMOTIVE AND ENGINEERING SERVICES

F.D. GROUP supplies innovative answers to technological and industrial challenges in the Automotive field. Thanks to the planning "on site" technical assistance, **F.D. GROUP** offers a wide range of engineering solutions to satisfy today demanding challenges. As a provider we give support during the entire productive cycle and we offer an integrated and multidisciplinary team work.

COMPETENCES

- Design and structures integration, systems and components
- Compound design
- Digital prototyping
- Modeling
- Material science
- Tooling
- Shell and structure Design
- Mobile unit design
- Mechanical components and various Design systems
- Interior design and accessibility
- External design
- Technical feasibility
- Powertrain
- Linear and non-linear modeling
- Completed elements modeling
- Computational Fluid Dynamics (CFD)
- Bodies simulation

Our highly skilled Engineers and designers have an important experience and unequalled knowledge in various engineering disciplines included materials, electronics, mechanics, plastic materials, structures and software development.

We are fast because we combine our engineers and designers experience with advanced analyses so that we are able to offer the most complete variety of products, equipments, systems and planning services availability.

USED TOOLS

Structural Mechanical Analysis (FEM)

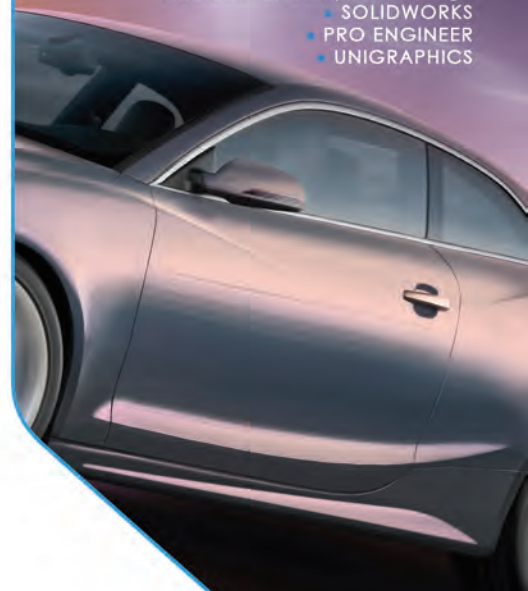
- ANSYS Mechanical
- PATRAN and NASTRAN
- HYPERMESH
- OPTISTRUCT
- RADIOSS
- COSMOS
- NASGRO V4

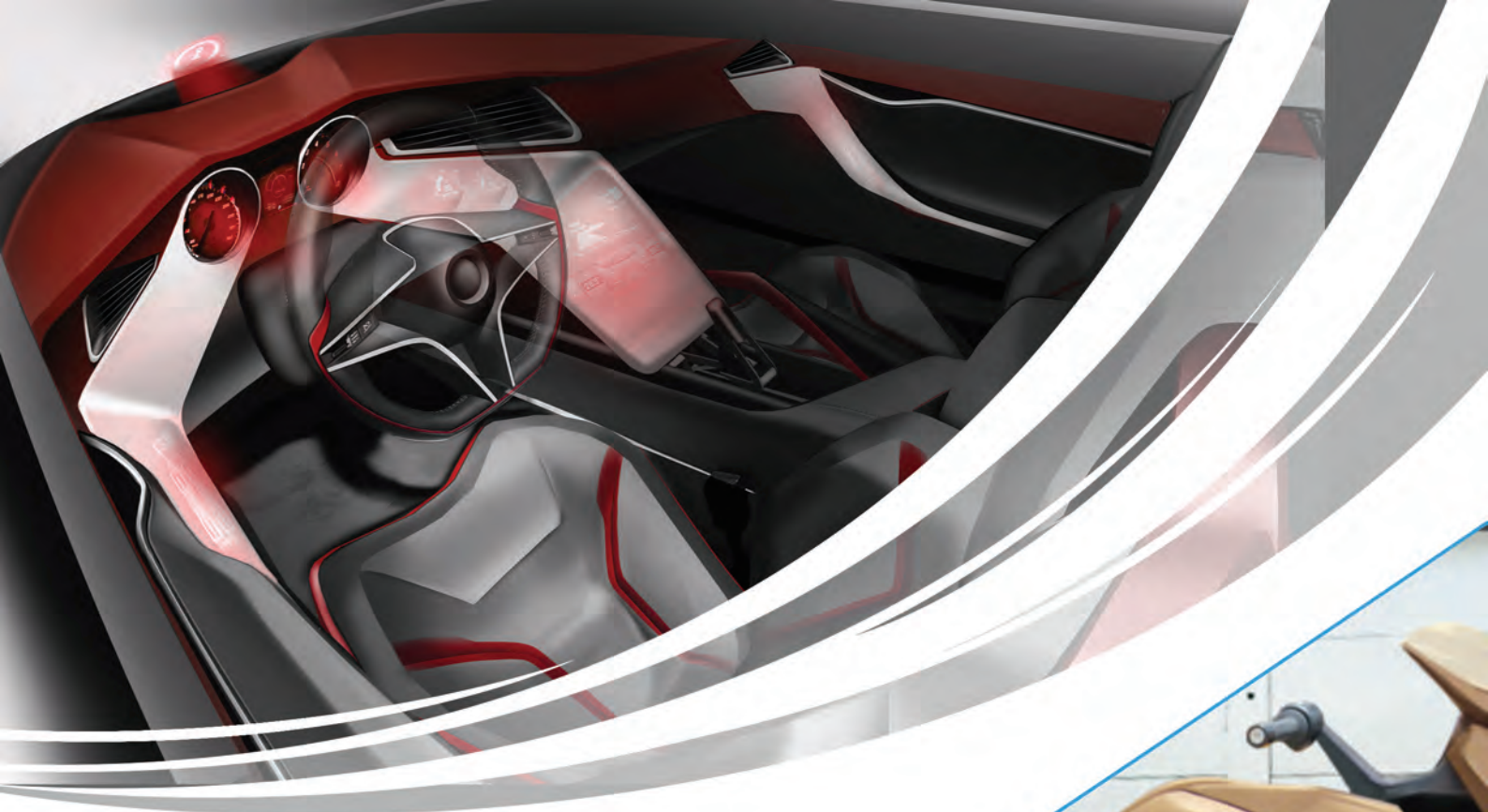
Computational Fluid Dynamics

- FLUENT

CAD

- CATIA V4
- CATIA V5
- FiberSim for composite Design
- SOLIDWORKS
- PRO ENGINEER
- UNIGRAPHICS





TRANSPORTATION DESIGN

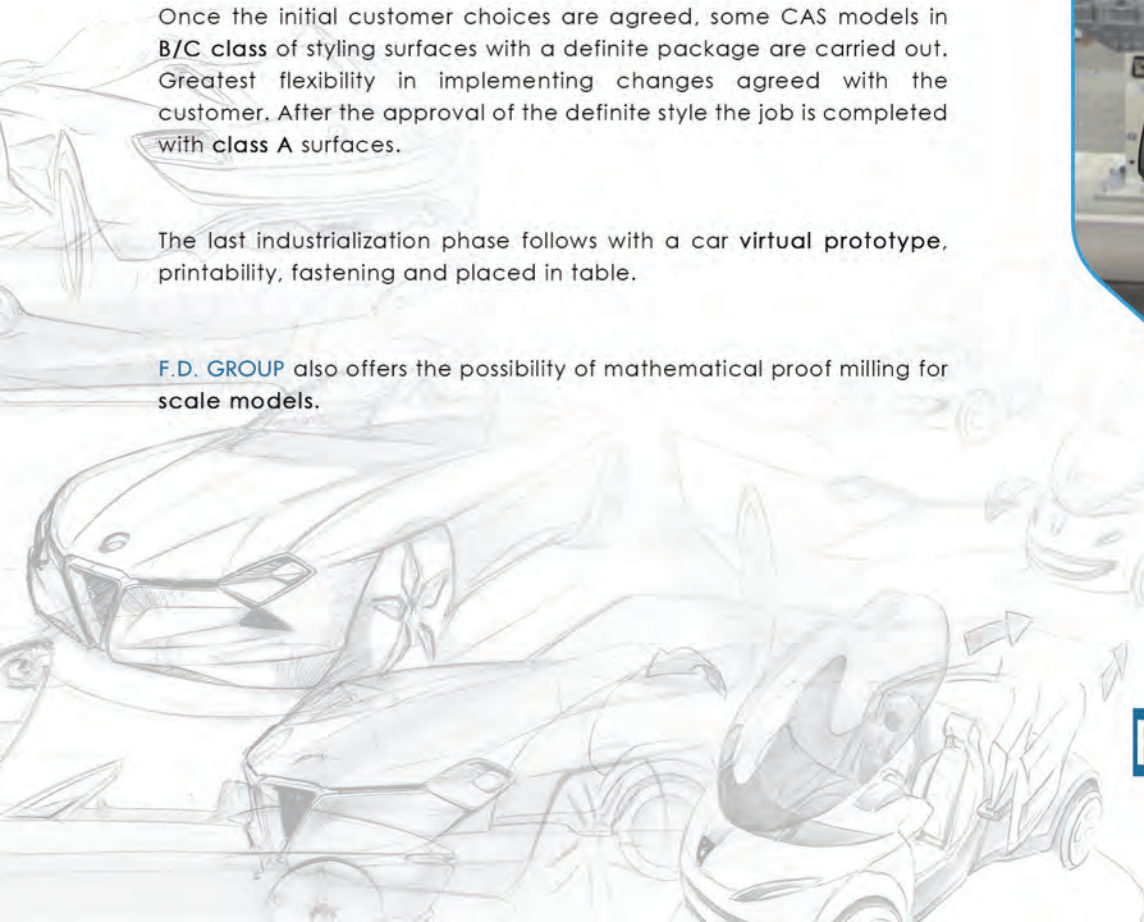
An intense briefing activity among our Technical Designer allows us a proper planning overview. An intense ideas sharing and possible solutions lead us to a series of external/internal drawings handmade and/or by PC.

Then our stylistic proposals arise, at customer's disposal for his first accurate evaluation.

Once the initial customer choices are agreed, some CAS models in B/C class of styling surfaces with a definite package are carried out. Greatest flexibility in implementing changes agreed with the customer. After the approval of the definite style the job is completed with class A surfaces.

The last industrialization phase follows with a car virtual prototype, printability, fastening and placed in table.

F.D. GROUP also offers the possibility of mathematical proof milling for scale models.





DESIGN

Our extensive expertise allows us to supply Design solutions in the following fields:

TRANSPORTATION

- Automotive
- Motorcycle
- Rail Transport
- Boats
- Customization

INDUSTRIAL DESIGN

- Product
- Technology Devices
- Food Design
- Toys
- Biomedical

F.D. GROUP takes part in the Concept phase, achieving planning proposals necessary to define the fundamental design elements and supply the basis for its fulfillment.

Our creativity aim is to generate ideas and possibilities that would allow us to be different from the other competitors.

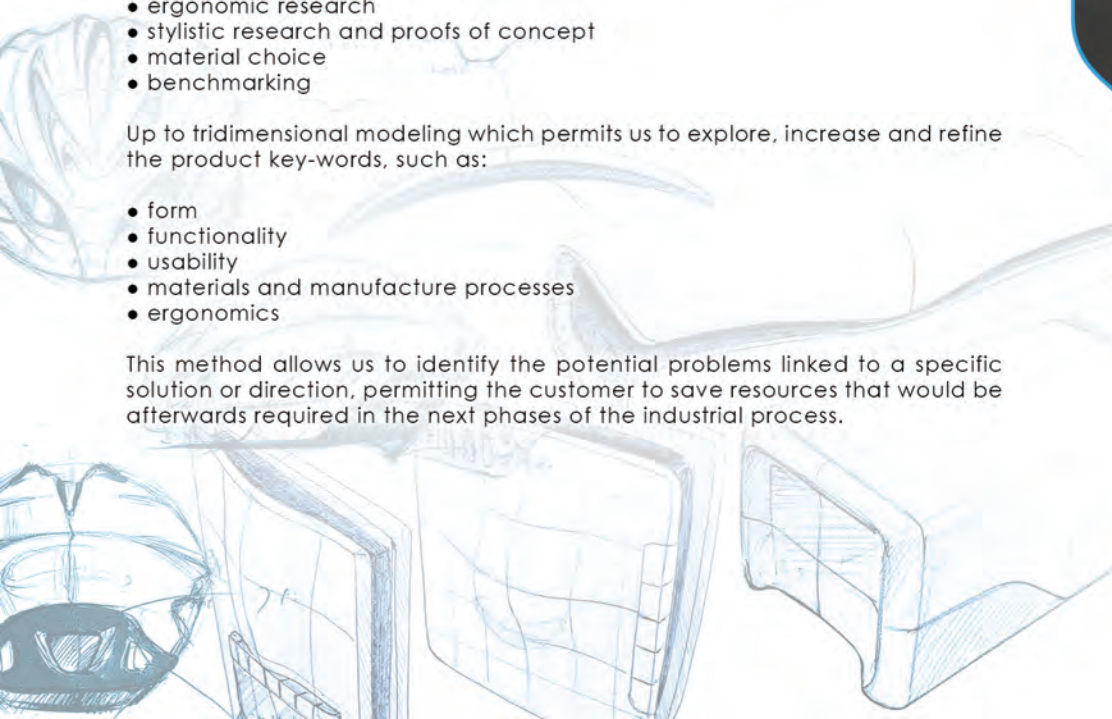
The concept phase in the form of sketch starts from the following concepts:

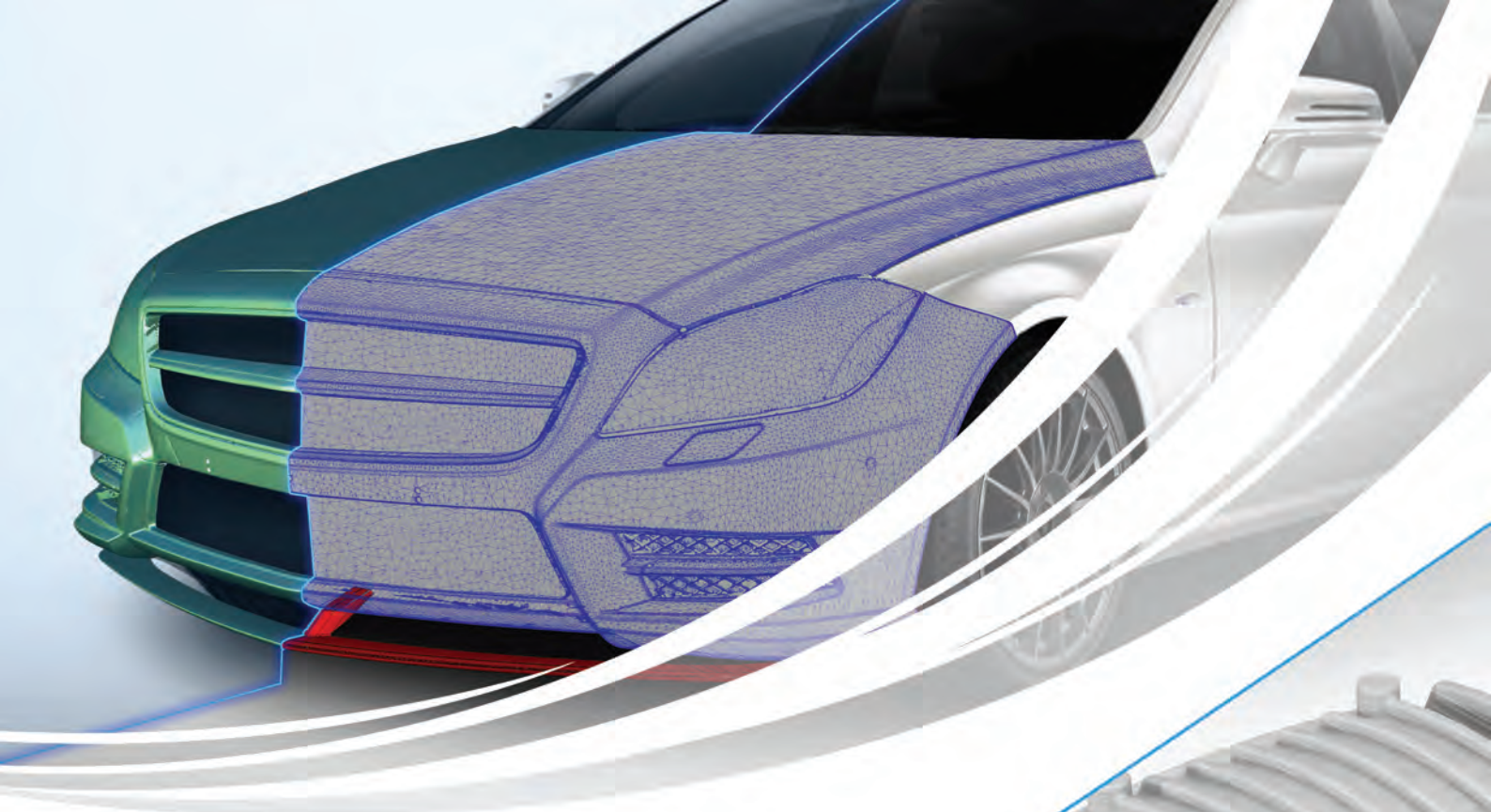
- ergonomic research
- stylistic research and proofs of concept
- material choice
- benchmarking

Up to tridimensional modeling which permits us to explore, increase and refine the product key-words, such as:

- form
- functionality
- usability
- materials and manufacture processes
- ergonomics

This method allows us to identify the potential problems linked to a specific solution or direction, permitting the customer to save resources that would be afterwards required in the next phases of the industrial process.





REVERSE ENGINEERING

This technology, even though independently developed, finds a perfect integration in Rapid Prototyping, as it was the natural complement. It is only a physical object scanning, through a 3D scanner, from which a file containing a tridimensional model can be obtained, so proceeding in the opposite direction ("reverse") compared to the classical planning: it is not a drawing that will be subsequently reproduced in reality and becomes a physical object, but on the contrary, a physical object that becomes a tridimensional drawing, from which then get identical copies to the original object, done in Rapid Prototyping.

RAPID PROTOTYPING

Rapid Prototyping overturns the typical industrial conception of mechanical productive methodology, substituting to the work for burr removal its exact opposite: some equipment able to run tridimensional virtual models, realizing complete models, creating the details through material supply.

This allows us to adopt absolutely innovative engineering solutions, permitting to modify directly the product during the phase of solid modeling, and in this way eliminating costs and times for molding creation.

Thanks to most modern stereo lithograph technologies and laser sintering, and with particular attention to design, we are in effect able to obtain prototypes, in some cases already "definitive" both in glossy and matte finishing, without any need of building molds.

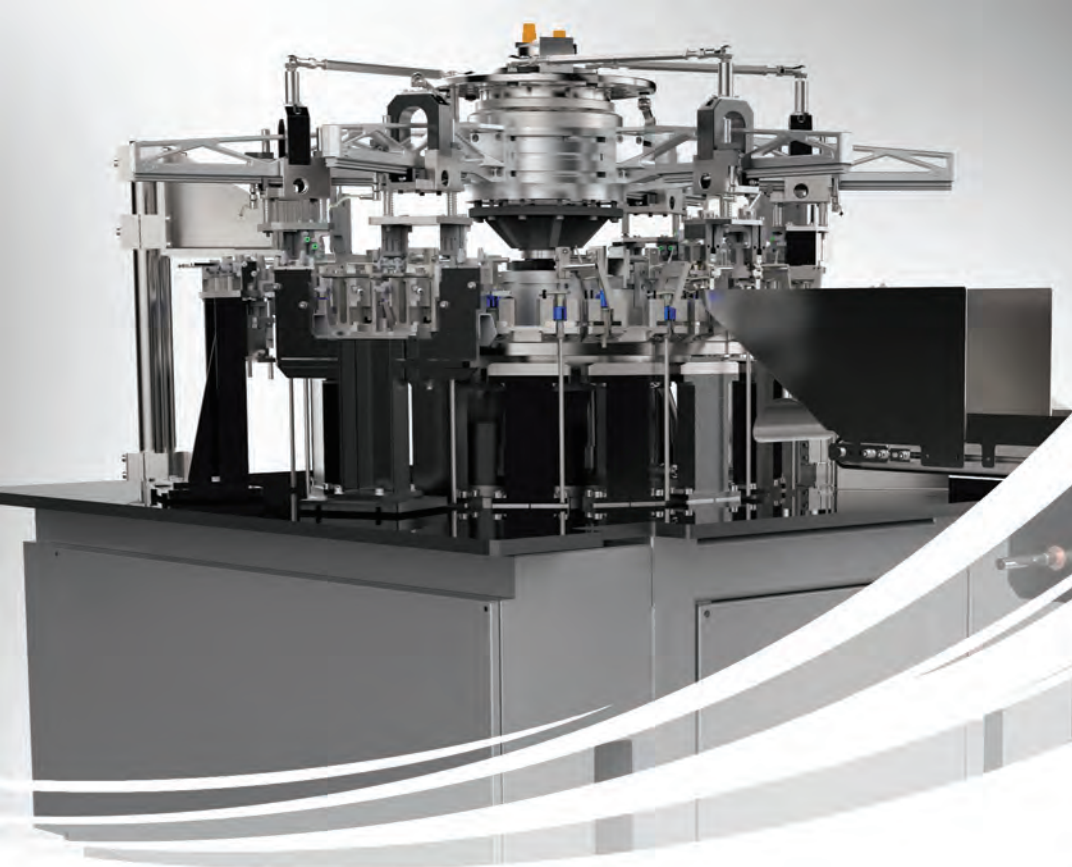
A few hours after tridimensional planning we can have the details for project and design controls.

The files regarding the specifics to be prototyped are realized in STL o IGES format (preferably in STL format).



OUR AVAILABLE TECHNOLOGIES ARE:

- Photopolymer
- SLS Selective Laser Sintering
- Metal Selective Laser Sintering
- Precision micromelting
- Silicon molds
- Hydro formatting



AUTOMATIC MACHINERIES

F.D. GROUP deals with drawing, special machinery , automatic machinery, machinery tools, robotizing plants and automation planning.

Our designers, carefully selected for the work to be carried out, therefore with a wide experience (experience gained in the piece manufacturing machineries, test benches, welding plant, product handling machineries, packaging machineries) are immediately hired either internally in our offices or to the customer headquarters.

Our mechanical creator is a modern, creative and dynamic company with an absolute priority, this is Customer satisfaction. New ideas, safety, quality, price, efficiency reliability and flexibility are our guidelines for any design. Our business roles are proud of a long-standing experience in the field of prototype construction, mechanical and automatic tools, and modular groups on a large scale and on the customer's selection.

Our mechanical creator proposes himself to the Customer as a technological Partner with the following activities:

- Plastics, rubber and silicon mould with customized robots
- Assembly automatic machinery construction
- Outsourcing assembly, manual and semi automatic work benches
- Conveyor belts and motorized rolls
- Re-engineering and revision of old machineries and existing plants
- Vision systems
- After-sale assistance
- This working procedure allows the customer to enjoy a support in design, but also a complete and turnkey solution for getting tools, prototype and machine.
- Our mechanical creator is equipped with a rolling stock, particular construction molds, mechanical assembly, pneumatic and electronic wiring.





E/E

Our service makes use of professionals already present in the staff, characterized by **extensive experience and professional advice in the E / E environment**.

For us, consulting means being constantly able to find innovative and functional solutions for our clients through our **recruitment department**.

OPERATIONAL AREAS:

- WIRING & HARNESS
- FIRMWARE DEVELOPMENT
- SOFTWARE DEVELOPMENT
- HMI
- V&V





INDUSTRIAL ENGINEERING

Our structure provides a **consultancy service** by selecting and positioning within your staff, engineering figures characterized by an **increasingly high level of preparation**, to give you the tools you need to face the difficulties of recent years.

FD GROUP adapts to the needs of each customer, meeting the specific organizational and design standards of the company and thus offering a personalized service

FD GROUP staff supports the internal structures of the client who find in it a useful integration for the resolution of specific problems, guaranteeing companies the opportunity to enter international markets with high-level engineering support.

THE DEPARTMENT OPERATING SPACES ARE:

- MANAGEMENT ENGINEERS
- PROCESS ENGINEERS
- MAINTENANCE ENGINEERS
- QUALITY ENGINEERS



PLASTIC

CONSULTANCY

- Plastic materials
- Plastic components design
- Injection mould studies preparation
- Mold achievement processes
- Molding processes
- Case Studies

MOLDFLOW ANALYSIS

- MOLDFLOW ANALYSIS
- Replenishment and Compression studies
 - Progressive Replenishment
 - Overprint of 2 elements (K2 molds)
 - Inserts overprint
 - Gas replenishment
 - Injection-compression
- Power supply system definition and tradeoff
- Fiber arrangement studies
- Mold Conditioning studies
- Post mold Deforming studies
- Mold parameters maximization
- Mid-plane, FUSION, 3D modality studies

STRUCTURAL ANALYSIS

- Structural check and maximization
- Static and dynamic capacity, linear and non linear

FEM MODELING

- Mesh Express Service in Midplane, FUSION e 3D modality

F.D. GROUP thanks to Pro/E, SolidWorks and SolidEdge software designs details in injection and thermo-shape plastic. Beverage e Packaging, vacuum cleaners, tumble dryers, remote controls, household products, accesses inspection devices, and even others are the experienced gained by our designers over the years. Furthermore, **F.D. GROUP** designs injection molds in the most various fields and technologies: automotive, household production, electrical appliance and double material.

MECHANICAL CUSTOMER SERVICES

Services structure

- Preliminary shaping
- Structural components planning
- Structural analysis
- Under stress analysis
- Analysis to completed elements
- Architectural models/designs
- Production support

Fitting planning

- Fitting planning
- Architectural models/designs
- Production support

- Computational fluid dynamics production support (CFD)

- Stationary and non stationary analyses of internal fluxes
- Combined heat exchange problems and radiation
- Two-phases fluxes and multiple elements through free surfaces processes
- Thermal comfort analysis of passengers' compartment
- CFD analysis, both thermal and structural

Complete and reliable global solutions

Interior Design

- Driver and passenger seats components planning
- Structural analysis
- Under stress analysis
- Analysis to completed elements
- Architectural models/designs
- Production support

Other

- Solid modeling
- Surfaces and cutting-edge surfaces
- Large-assembly
- Lay-out / Obstruction study
- Cabling / Tubing
- Reverse Engineering
- 3D Conversions
- STEP-IGES-STL
- Catalogues



METODOLOGY

The design, the architectural design realisation, the FEM and structural analyses and all that is pertinent consulting and industrial design, is assigned to our engineering and mechanical experts staff, which can be proud of its highest level of professionalism, as well as a long experience in the sector.



CUSTOMERS

Among the various Companies we keep lasting job relationship we remind Tetrapak that holds the world leadership in the field of Beverage and Packaging. Our current customers are small and medium businesses that have not the possibility of developing their designs internally, they turn to our study for a high level professionalism cooperation.



PRIVACY

In compliance with the legislative decree DLgs 196/2003 on the subject of personal data protection, our Study is tied to absolute confidentiality regarding the miscellaneous information it can hold during the execution of its own activity. In the category is included all the linked material in every form. The computer material (designs, studies, assembly, detail drawings, files in general) are wholly protected by password, firewall and other electronic protection devices and, when the job is completed, it is all given to the customer, printed material included.



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CONSULTANCY DESIGN PLANNING SUPPORT

F.D. GROUP is operating in the mechanical planning field and in engineering services; it is specialized in the plastic manufacturing field and in the plastic components production.

Its capacity of updating constantly in order to be able to always supply the most adequate solutions to customer's requests makes **F.D. GROUP** extremely dynamic, flexible and suitable to adapt to medium and large Companies needs reality.

Our qualified structure, the use of advanced technology, the close cooperation with the customer and our capacity of proposing the best solutions guarantees professionalism, quality and reliability.

F.D. GROUP is a company able to respond to big companies expectations thanks to a complete offer of services, advices and innovative technological solutions.

The acquired skills make **F.D. GROUP** a reliable partner for all the Companies in the main markets.

F.D. GROUP's Mission as a principal actor in the Engineering innovation and consultancy is that of supporting the most important Companies in their planning achievement.

For this reason, **F.D. GROUP** is not only research and technological evolution, but also knowledge, and permanent attention towards resources training.