DOTT. ING. GIANLUCA MASSACCESI
SCIENTIFIC AND TECHNOLOGICAL CONSULTING

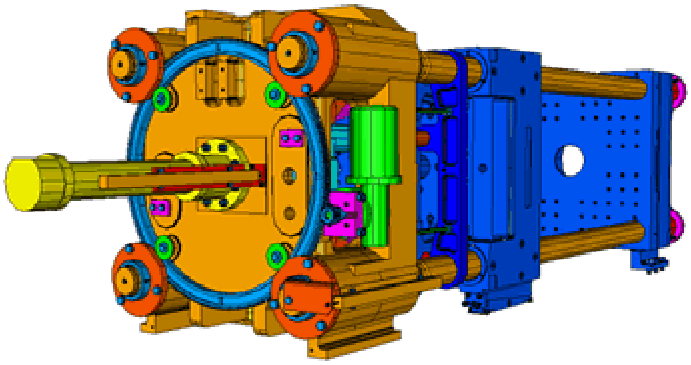
BACKGROUND

The expertise began in 1990 at university and research centers of the automotive (**FIAT Research Center**) and chemical (**ENICHEM Application Development Center**) sectors, where the first applications of virtual simulation methodology in the Italian industry took place.

A passion for computer applications in the modeling of physical phenomenon and industrial processes drove the application of this expertise to integrate FEM and test methodologies in order to achieve the maximum level of quality and security for commercial products (**Marzocchi suspensions**).

Then the time came to face the entire development process and to gain experience in project management and leadership of the development team (**Magneti Marelli**).

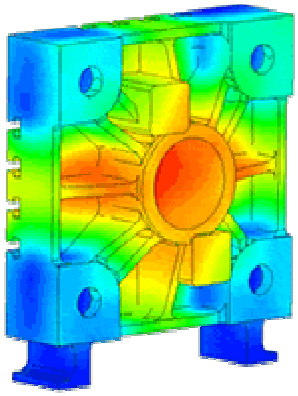
As a CAD CAE consultant (**Altech**), the most prestigious Italian industrial companies benefited from the years of experience and exceptional drive for perfection that were made available to them.



SERVICES

The services offered concern a fundamental concept of the modern product development process: Virtual Prototyping**.**

Virtual Prototyping allows for the complete definition of all the characteristics of an industrial product without physically producing the prototype. By using this technology it is possible to know:

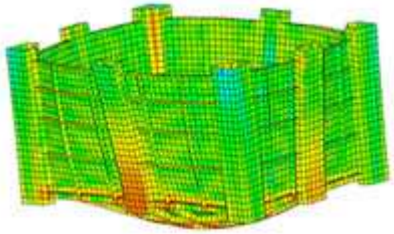


- the esthetic form and impact, by using highly realistic image rendering to produce an image of photographic quality;
- the physical properties and response to stresses, whether they be static, dynamic, thermal, electromagnetic or fluid dynamic, of the product under the actual working conditions of its operative environment;
- the industrial production process, whether it be for machine tool processing, injection molding, thermoforming, blow molding or die-casting.

By adapting such methodologies in the development process of a manufactured good, a machine or a mechanical system, we can:

- highlight the critical factors of the project and rapidly verify alternative solutions;
- optimize the esthetic and functional form and characteristics;
- minimize material and production costs;
- reduce time and cost of laboratory trials and tests, and the time to production;
- define the technical specifications and testing standards in a rigorous way.

Linear and non-linear, static and dynamic structural analysis



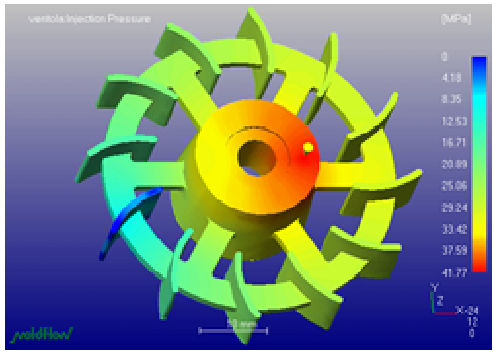
Validated by techniques offered by the science of classic constructions, this method allows the verification of structures that can be very geometrically complicated, and impractical or impossible to model with analytical formulas.

The static linear structural analysis is capable of simulating the response of a mechanical system to an assembly of loads and constraints. The linearity hypothesis of the material's elastic behavior, which is the basis for this calculation method, has been shown to be reliable and efficient.

By using the appropriate solver, and taking in to consideration the hypothesis of geometric and material non-linearity, it is possible to simulate conditions of large displacements and large deformations. It is also possible to consider the action of constant, or variable, loads applied over time, and thus simulate the phenomenon of drift (creep), or the progressive yielding of a structure (buckling).

The linear dynamic analysis makes it possible to calculate the way a structure vibrates. It can be used to verify that a structure does not enter in resonance in a determined frequency range. Another important use of the results produced from this type of analysis is the response analysis in frequency, or the possibility to simulate the response of a structure at a fixed temporary dynamic stress, as that exercised by a single or periodic impulse, when a non-stationary forcing function is modulated according to a specific frequency. A further extension is the response analysis at a random frequency, where the loads are modulated according to a defined frequency spectrum. Typical applications of these kinds of analyses are for automotive and aerospace component validation.

Injection mold analysis

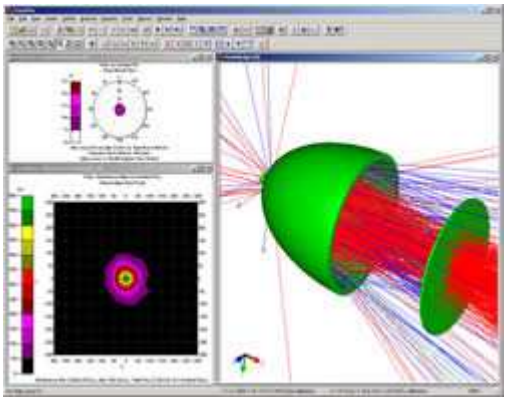


Today, through the techniques of finite element simulation, it is possible to simulate the injection molding process in a very precise way, determining in each point of the cavity a record of the thermal, pressure and dynamic fluid values at each moment of the process.

It is therefore possible to give the customer, together with the design of the mold and manufactured parts, useful information regarding the production process such as pressure and temperature ranges, stress due to viscose forces, flow progress front, position and thermal history of the weld lines, air traps, injection pressure and clamping forces. The information that can be obtained is extremely useful in the project optimization of the article, the mold and injection system, and the parameters of the molding process.

Optic system analysis

The 3D solid mathematics of an optical system make it possible to simulate the polarization, scattering, absorption, diffraction, reflection and refraction of light rays.



By using the appropriate numerical analysis it is possible to calculate the following:

- irradiance, intensity, flux, temperature dependence and spectral distributions;
- stray light (including ghosts), scattered light and aperture diffraction;
- light distributions in imaging and non-imaging systems;
- polarization effects;
- scattering and propagation in biological tissue;
- true color appearance.

Using ray-tracing techniques, the models created by CAD systems can be used directly to model optic behavior, allowing the analysis of: telescope and camera systems; lenses and optical components; microscopes; infrared imaging systems;

optic sensors; spectrometers; light pipes and multi-mode fibers; LCD projection systems; illumination systems; luminaires and light fixtures; automotive lighting; endoscopic and medical applications; laser systems.

Other application sectors of virtual prototype methodologies:

- mechanism kinetic dynamic
- thermal and thermo-structural analysis
- dynamic thermofluid analysis
- acoustic analysis

During the EuroStampi exhibition it would be our pleasure to present our abilities to you at **Pav. 6 - Stand J 32**.

For further information we would like to invite you to visit our site www.ing-gm.it or contact us directly:

DOTT. ING. GIANLUCA MASSACCESI
SCIENTIFIC AND TECHNOLOGICAL CONSULTING
Via Banchieri, 27
40133 Bologna - Italy
Telephone: +39 (0)51-566391
Portable phone: +39 348-4758772
Fax: +39 (0)51-567745
e-mail: gianluca.massaccesi@tin.it