

CATIA MOLD AND TOOLING

MANY CHALLENGES. ONE EXPERIENCE



HIGH CONSUMER EXPECTATIONS, STRONG GLOBAL COMPETITION, AND TOUGH ECONOMIC CONDITIONS RAISE THE PRESSURE ON THE MANUFACTURING INDUSTRY, AND PARTICULARLY ON TOOLMAKING COMPANIES

Turning challenges into competitive advantage

Cars, high-tech products, home appliances, industrial equipments, medical devices, ...: the quantity, complexity and variety of products that we need or that we want increase every day.

We expect these products to be quickly available, more affordable and highly reliable.

To be able to produce them according to such expectations, it is necessary to ensure their manufacturability as early as possible, to devise an efficient and controlled process to fabricate them and to react quickly and safely to any change in their definition or in their production environment.

More than ever, toolmakers need to deliver fast, to be in control of costs and to deliver uncompromising quality in order to keep a real competitive edge.

Mold and Tooling solution focuses the power of CATIA to address toolmaking challenges. It delivers a flexible and highly-customizable approach to perform conceptual and detailed tooling engineering, enabling companies to:

- Implement a lean, integrated, easy-to-operate process from part design to tooling engineering and tooling manufacturing.
- Check and enforce manufacturing compliance very early in the virtual process.
- Develop tooling standardization, automate design tasks and assist engineering decision-making.
- Achieve agile and reactive collaboration inside and across teams.
- Expand corporate engineering assets by facilitating skills development, securing their capture and reuse throughout projects.

From small companies to larger organizations, for simpler or more complex projects, this means massively increasing the productivity of the global process, being able to predict and control project timeframe, guaranteeing the right quality at the right cost, reducing dependency on staff turnover and minimizing critical or stressful situations.

In the end, successfully tackling the challenges creates the competitive difference.

TRANSFORMING TRADITIONAL DESIGN INTO COLLABORATIVE ENGINEERING-TO-MANUFACTURING



CATIA Mold & Tooling Solution

At the heart of the Mold and Tooling solution, CATIA Mold Tooling Design package offers a dedicated and comprehensive functional set as well as rich resource contents specifically developed to meet the needs of experienced as well as junior engineers.

From design part data import (for non-CATIA native data) to molded part preparation, core/cavity separation, tool structure design and validation, engineering teams can rely on a knowledge-based, customizable and easy-to-use environment enabling them to create the optimum workflow.

CATIA Jigs and Tooling Design package brings the power and flexibility of CATIA Tooling technology to Stamping Die, Progressive Die and Jigs & Fixtures designers.

CATIA Generative Sheetmetal solution offers to Progressive Die designers the capability to manage the forming process directly in 3D in an intuitive way.

CATIA Realistic Shape Optimizer application provides the advanced deformation management capabilities that enable to bring virtual engineering closer to real forming processes (for example to compensate complex plastic molding shrinkage or sheetmetal stamping springback).

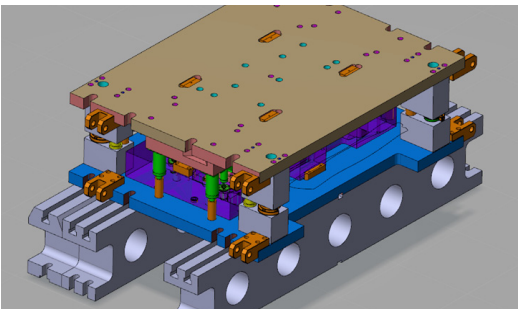
Best-in-class CATIA Knowledgeware package brings automation, know-how-embedding and validation capabilities even further, thus providing the natural complement to optimize the definition and execution of the global tooling workflow.

The V6 platform, combining the power of CATIA Engineering, DELMIA Manufacturing and ENOVIA Collaborative Innovation provides a unique global experience to solve the many challenges that toolmakers have to face at every step of their processes.

“With CATIA for Mold, we drastically reduced our design time from one month to one week. It’s a complete tooling design and manufacturing preparation solution within the integrated CATIA environment.”

Jae-Deok Shin
CEO, Woojin High-Tec, South Korea

FROM DESIGN PART TO MANUFACTURABLE PART TO PART PRODUCED AS DESIGNED



When facing a part designed with other systems than CATIA, the tool designer can rely on a wide array of data translators (standard formats like IGES and STEP, or native formats like Parasolid) to import the design model into CATIA.

Checking and healing geometrical and topological data (gaps, duplications, overlaps, ...) can be performed quickly and efficiently to ensure accurate data definition for the next design stages.

Discovering manufacturability issues late in the process can cause serious delays and significant cost increase: being able to analyze, report and solve issues early is key to keeping things under control.

Dedicated capabilities enable to analyze the design part to check for potential formability problems, to assess manufacturing complexity, and to display results in 3D:

- Analyze draft angles
- Check fillet radius values
- Detect sharp corners
- Analyze wall thickness
- Detect undercut areas

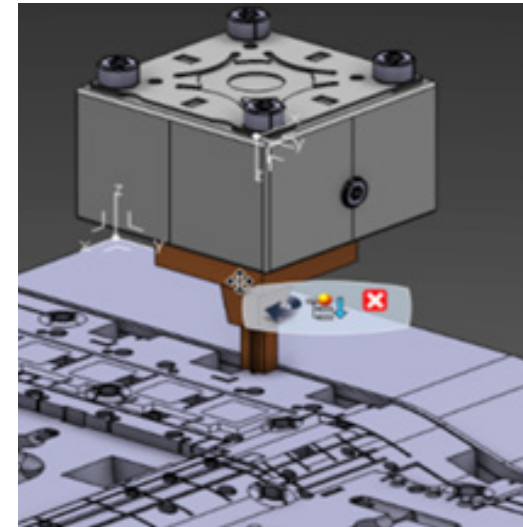
Ensuring that the part produced will be as expected may require a lot of work in order to compensate in the virtual model the deformation that occurs when the physical part is actually formed. The values for the deformation may come from experience, simulation, or digitization of a physical prototype.

CATIA advanced shape deformation capabilities enable the design engineer to easily take this information into account to apply and to trace the proper counter-deformation to the nominal virtual model to ensure the right physical part is produced, thus saving a lot of time and effort.

"We can model and modify vehicle part surfaces in great detail. In so doing, we can avoid upfront, costly retooling further down the line."

Jürgen Faller,
CAD/CAM Production Department Head, LÄPPLE AG, Germany

FORMING IT RIGHT, QUICKLY AND SAFELY



One of the most time-consuming tasks for the tool designer is defining the forming-related elements of the part: core/cavity blocks, lifter/slider heads, sub-inserts, and electrodes.

CATIA's unrivalled surface design capabilities provide the power, flexibility and ease of use to achieve fast and efficient mold areas preparation, for simple as well as for complex tool shapes:

- From one-click separation to highly-detailed area rework
- Assisted detection of sliders, lifters, and special areas (ejectors/core pins)
- Parting Line and Parting Surface creation wizards
- Automated, customizable, knowledge-based design of shut-off areas
- Co-authoring between several designers on the same part to speed up complex designs by working in parallel

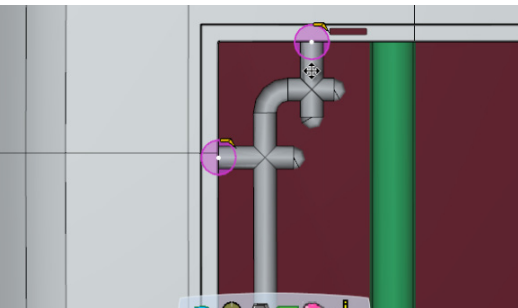
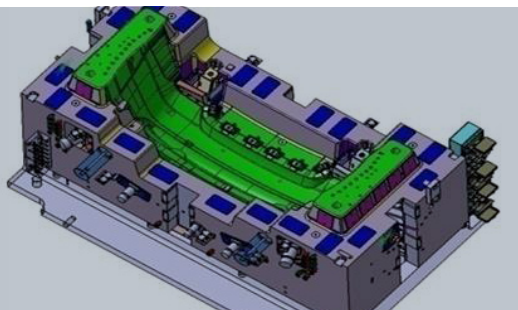
The design of electrodes is accelerated thanks to:

- Powerful assistant for contour definition and selection of cavity faces
- Automatic creation of electrode cavity shape and reinforcement area
- Easy selection and fitting of holder in library
- Automated recognition of similar cavity areas
- Automatic creation of documentation

To shorten process cycle time, the design of the tool most often starts before the part design is finalized, making it mandatory for the toolmaker to be able to identify design changes that have been made in new revisions of the part.

Through detailed geometrical analysis of two part revisions, CATIA displays and extracts modified areas in 3D, thus enabling the user to safely detect, review and validate geometrical differences between part versions. Changes can be propagated into the current tool design, therefore avoiding costly redesign.

TOOLING ASSEMBLIES ARE COMPLEX SYSTEMS: HOW CAN ENGINEERING BE MADE SIMPLER, FASTER AND MORE ECONOMICAL?



Creating mold tool assemblies fulfilling the high time, cost and reliability requirements induced by an extremely constrained environment requires going beyond traditional 3D design.

Effective answers can be found in laying out a clear, structured and controlled workflow (often involving many actors inside or outside the toolmaking company or department), in leveraging engineering expertise, in promoting collaboration and concurrent design, and in minimizing material and intellectual costs through advanced standardization, process-driven automation and integrated total validation.

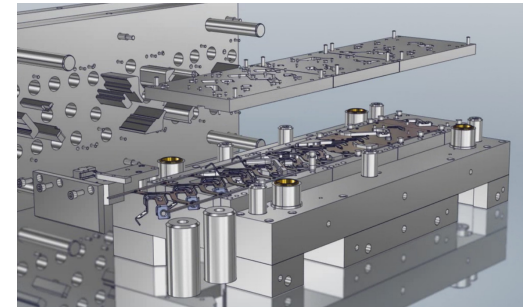
CATIA dedicated Mold Tooling Design solution enables to transform laborious design into innovative engineering.

The first foundation for transformation comes from a process-oriented design approach:

- Mold project structure to federate products from all design stages and to secure mold design lifecycle
- Dedicated functional assistants to streamline design stages : Core/Cavity preparation, Mold Base selection, Cooling system layout, Gate/Runner system design, standard and user-defined components instantiation)
- Express and check design intent through logical patterns of components: for example, a senior designer can layout the ejection system that will be finalized later by a less experienced engineer.
- Clear structuring enabled by explicit typing of tooling assemblies, components and systems (fixing elements, guiding elements, coolant channels, ...) : elements are organized in families and functional types to enable dedicated behaviors all through the lifecycle of the mold tool (support of design intent, clear user assistance, easy searches in the database, ...) :

The second foundation is brought through lifelike collaboration:

- Immersive, context-driven user interface that is more intuitive, more efficient, and more ergonomic, guiding user attention on actions to be performed where they should be performed
- Native concurrent engineering : when design complexity or time constraints call for maximum speed, then sequential design is no longer an option and work can be efficiently distributed between designers to accelerate overall efficiency
- Share, integrate and review in a safe way the full mold project on the V6 platform: whatever their geographical location, all process actors can rely on a single version of the truth (avoiding data duplication and risk for discrepancy), and data is filtered according to the access rights attached to each user role.



The third foundation is to standardize, customize, and embed know-how:

- Rich resource content is provided off-the-shelf libraries of mold bases and components: ejector pins, screws, leader pins, bushings, baffles, eyebolts, interlocks, O-rings, return pins, washers, sprue bushings, etc.
- Many libraries from major market providers are available: DME, DME America, Futaba, Hasco, LKM, Meusburger, Misumi, National, PCS, Pedrotti, Punch, Rabourdin, and Strack.
- It is easy to define and reuse custom templates for tooling structure, components and systems (cooling, injection, ...), thus capitalizing the most advanced and efficient company-specific designs to accelerate completion of similar projects.
- All resources are shared in the central database, ensuring consistency throughout teams and projects
- Built-in and user-defined intelligent behaviors in tooling structures, components and systems (variant selection, drilling impacts, form fitting, kinematics, ...) bring speed and consistency at every step, thus reducing risks of mistakes, freeing up design time, and increasing user attention to confidently evaluate alternatives and optimize design.

The combination of V6 breakthrough technologies and a CATIA specialized solution offer a powerful answer to the challenges of the toolmaking industry, supporting companies in transforming their business for sustainable excellence, innovation and profitability.

"With constantly increasing competition from countries with low cost labour, it is important for us to maintain our leading position on the market by using the best tools and machines available, and to automate our processes from design and tool construction to tool manufacturing".

Hans Lauridsen,
CEO, Techno-Tool A/S, Denmark



Delivering Best-in-Class Products



Virtual Product Design



Model and Simulate our Planet



3D for Professionals



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Realistic Simulation



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Global Collaborative Lifecycle Management



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