# FORM-ADVISOR

## Upfront design & analysis software for stamping process design

**30 minutes** *to design one stamping process*

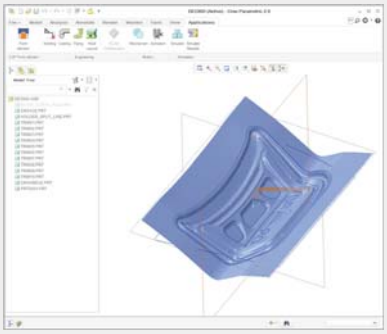
**1 hour** *to validate a design solution*

**1 day** *to compare 4 to 5 solutions*

The first increment-based design and CAE solution for sheet metal forming fully integrated with MCAD systems, providing most accurate and feasible results for automotive and progressive stamping.

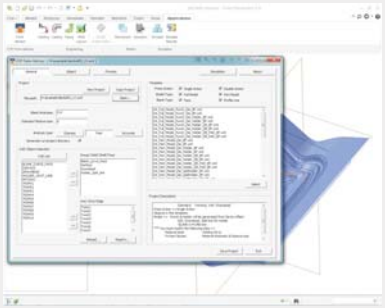
## 3 Steps from design to validation

1



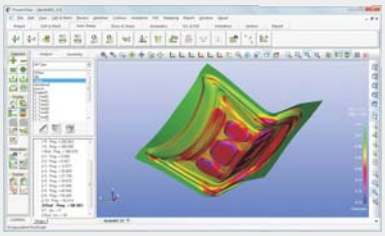
Form-Advisor is fully integrated into the MCAD systems (suac as PTC's Creo system) .After the part and/or die face design, one button can shift between Form-Advisor's process design and design validation interface. All operations are in the same environment.

2



Form-Advisor uses the template technology to define the objects and process parameters, reducing the workload for operations to the minimum. A few clicks to define all the objects and properties in the MCAD environment.

3



PowerView is used to display the simulation results . It is a powerful, flexible and easy-to-use tool for stamping process analysis.

## Why Form-Advisor?

**Unique for design:**
Built-in process design capabilities for rapidly creating, validating and comparing design solutions.

**Unique for validation:**
The 1st increment-based CAE solution fully integrated with the MCAD environment, simulating all stamping phenomenon in a few clicks.

**Unique for engineer:**
The easiest, fastest, powerful solution to bringing CAE validation to daily design process. The software is based on the familiar CAD environment for all design activates and CAE simulation, eliminating the gap of CAD and CAE and reducing the learning curve to minimum. No CAE background required.

## Why MCAD System Integration?

Synchronous design and validation is necessary in a business where 'Time to Market' is key.

Works within the modern 3D MCAD systems and user's native assemblies for simulation. Reduce learning curve for new system.

CAD driven simulation. When you make a design change in your MCAD system, you will see the change instantly in Form-Advisor.

Allows for the design, simulation and engineering decisions to be handled by the same person from day one of the project.

# FORM-ADVISOR for MCAD

The Form-Advisor, an unique sheet metal forming solution for automotive and progressive stamping base on the incremental technology, now directly works within MCAD environments. It is the new generation metal forming CAE system built from day one specifically for integration within the design process.

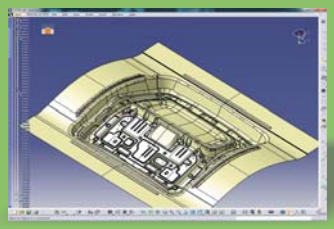
This integration not only improves the consistency of design data in CAD and simulation system, but also greatly improves the speed and efficiency of design and engineering cycles.

This innovative software puts metal flow, thinning and wrinkle, stress and strain, springback analysis into the hands of the same people who are responsible for developing the stamping product, mould and making engineering decisions.

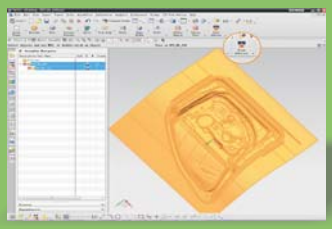
## Simulation driven by CAD data

With Form-Advisor, your CAD geometry drives the simulation process. When you make a design change in CAD system, you see the change instantly in Form-Advisor in a few clicks. It's hassle free.

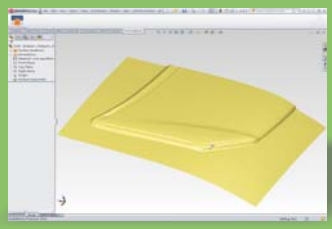
The user does not have to be an expert in simulation and the time required for evaluating a stamping design is remarkably quick. In other word, Form-Advisor can help the industry achieve the target of 'Time to Market'.



Form-Advisor in CATIA



Form-Advisor in NX



Form-Advisor in Solidworks

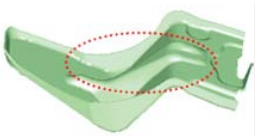
# Stamping Process Works

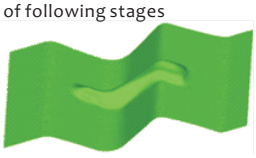
The Stamping Process Works (SPW) module, specialized for process planners and tooling designers, enables rapidlycreating a stamping process design and generating a die face for the complete stamping process. SPW is not only used for typical one stage stamping widely but also very useful for progressive die design. The application of SPW includes automotive, electronics, consumer applications and many others.

SPW can speed up the process design ten times the speed of the traditional CAD method. As a result, process planners or die designer can generate several different tooling concepts and stages plans at a very early stage and send them to CAE system for validation. With SPW in Form-Advisor, 4 to 5 design solutions can be designed and validated in a single working day.

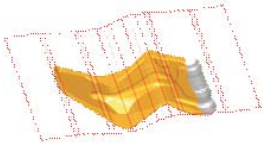
A 3D part of automotive industry

Filling the part holes and addendum of following stages



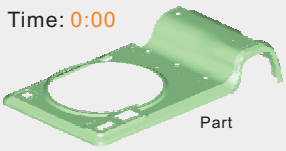


Define the drawing feature of the first stage and generate the die face for validation. With its powerful Boolean operation functions, SPW caneasily and directly extract features from 3D part.



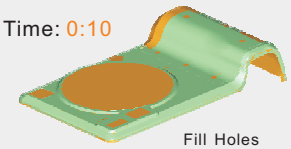
The designed holding face and addendum for the second stage of drawing. SPW helps generate the die face. Key parameters , such as drawing depth, draft angle and fillet radius are fully defined in parametrically. The total lead time of modeling was less than 30 mins.

Time: 0:00



Part

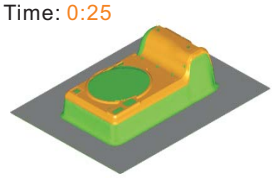
Time: 0:10



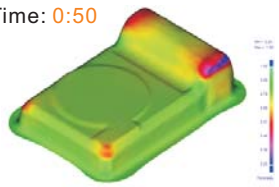
Fill Holes

## Plan A
*Single Stage*

Time: 0:25



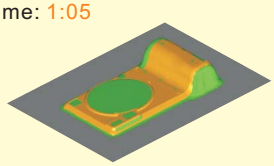
Time: 0:50



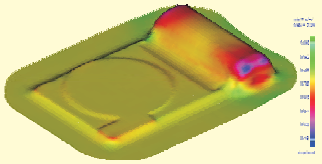
Corner Crack

## Plan B
*2 Stages*

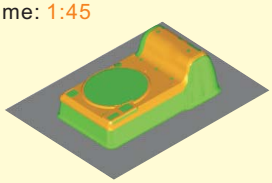
Time: 1:05



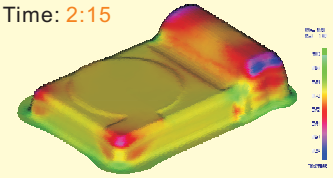
Time: 1:30



Time: 1:45



Time: 2:15



Part Safe

The first increment-based design and CAE solution for sheet metal forming fully integrated in MCAD systems, providing the most accurate and feasible results, requiring only 2 hours to compare two design solutions.

# Form-Advisor Professional

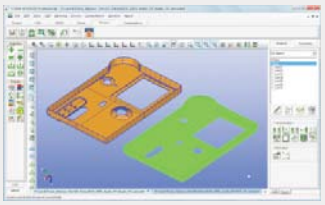
Form-Advisor provides the user with unstricted capabilities and can handle more than 90% industry's needs in the MCAD environment. However, some users would seek a fuller solution with advanced functionality for more complicated jobs, and for this we present Form-Advisor Professional.

Form-Advisor Professional provides a stand-alone interface specialised for more advanced jobs or complicated processes. The software houses a powerful 3D CAD and meshing system, and also comes with a multitude of advanced modules such as:

**Springback compensation:** provides geometry compensation capability for springback in die face

**Solid Forming:** provides the solid elements capabilities for special applications, such as ironing or light forging

**Local flange & One step analysis:** provides part level stamping analysis capability and quick blank sheet prediction



The user interface of Form-Advisor Professional, with OPEN CASCADE technology

FORM-ADVISOR SUPPORT MCAD SYSTEM

| CAD SYSTEM | SUPPORT VERSION |
|---|---|
| PTC/CREO | WF V4 - Creo 2 |
| SIEMENS/NX | V5 - V8.5 |
| SolidWorks | 2009 - 2012 |

*Software language: English, Japanese, Korean, Chinese*

## Industrial Capabilities

Tonnage estimation
Draw-slit analysis
Asymmetric holding calculation
Bending Springback calculation
Forming margin estimation
Laser welded blank forming
Blanksheet outline optimization
Stamping feature simulation
Drawbead computation
Springback alert
Split and crack alerts
Stiffness analysis
Material flow analysis
Lubrication suggestion
Surface defects alerts
Material formalities study
Stabilization of progressive stamping

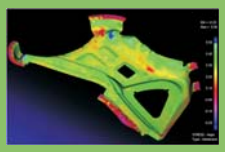
Initial blank

Forming progress

Formed part

FLD

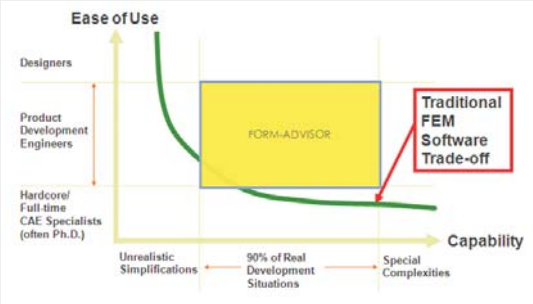
Trimming



Springback

## Upfront Analysis vs Traditional Simulation

It is well known the traditional numerical simulation is either not suitable or too expensive for the conceptual stage. The data to run a numerical simulation is usually not available yet, e.g. the full die face geometry. This is usually requires several hours or even days. Setting up the whole simulation model is also a difficult job.




Form-Advisor balances robust functionality with easy of use, allowing user to solve at least 90% of problems encountered in the engineering industries in an express and effective manner.

Form-Advisor vs Traditional CAD & CAE

| | Traditional CAD + CAE | Form-Advisor |
|---|---|---|
| Process design + Die face generation (i.e. for 2 stages) | >5h | 30 mins |
| CAE Modeling & Setup | 1h | 10 mins |
| CAE simulation time | 5h | 1.5h |
| Design #1 | >1 day | 2 hours |
| Modify geometry | 3h | 20 mins |
| CAE Modeling & re-setup | 1h | 10 mins |
| Re-run the 2nd route simulation | 5h | 1.5h |
| Design #2 | 1 day | 2 hours |
| **Try 4-5 cycles** | **5 days** | **1 day** |

# Best Class of Form-Advisor

## Design, Meshing and Model Setup

- Built-in, next generation fully automatic meshing technology, NO MESH CONCEPT TO USER. Suitable for any type of CAD data with powerful CAD defect repairing.
- Built-in SPW (Stamping Process Works) technology, ten times faster than traditional CAD methods.
- A complete solution chain, from metal forming part, to process design creation and die face generation, to numerical simulation in the very early stage.
- Extremely simple user interface, fully integrated into MCAD environment, fully associative and regenerative to drastically reduce downstream design changes
- Using template design technology, process setup is very simple and logical. The user can focus on the stamping process and engineering improvements rather than grappling with using software.
- Simplicity in defining progressive stamping and multiple-stage forming. Suitable for all stamping processes

## Solver Technology

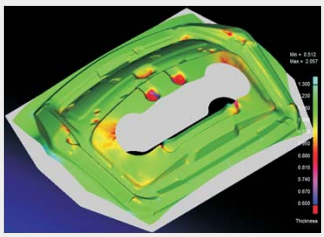
- Based on incremental technology rather than one step simulation.
- The built-in solver kernel includes Impact and Aster technologies, the merits of which have been proven by the industry widely in the past 20 years. Built-in Stamp-Engineer advanced solver technology.
- Couples explicit incremental solver and implicit solver together, performing the whole range simulation of metal forming, includes gravity, holding/closing, stamping/forming and springback
- Special design for automotive stamping and progressive stamping process, support thin blank and thick blank forming, suitable for complex 3C parts.
- Accurate physics modeling, efficient calculation of the formability based on the die design.
- Rich simulation result. Includes safety zones, forming zones, FLD analysis, splitting, thinning, wrinkling, thickening, material flow and draw-in, stress, strain, optimal blank shape, light strip and skid mark, flatness and springback etc.

## Analysis Results

Wrinkle tendency
Undercut
Strain path
Draw in
Thickness & thinning
Material flow vector
Springback zones & magnitude
Skid line
User defined diagram
Stiffness analysis
Flatness prediction
Strain and Stress
Contact force
Normal pressure
Sections
Process animation
Blank outline optimization
Forming limited diagram

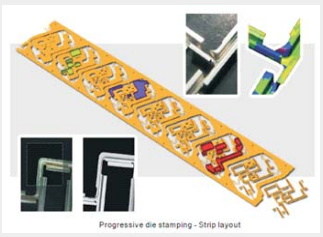
2D Templates

Stamping feature study is an unique function of Form-Advisor Professional for precision stamping. It can study the detail parameters of stamping features and use for progressive stamping widely.

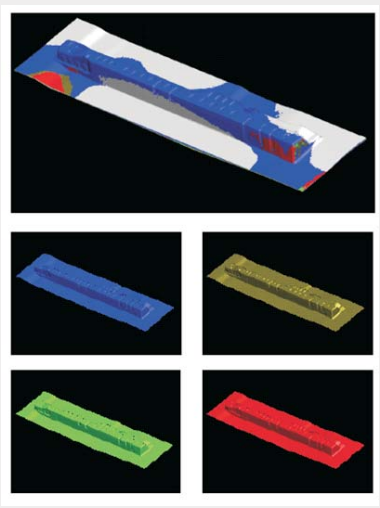


Auto Penal

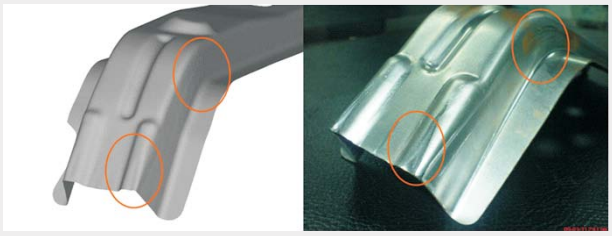

Springback for Coffee Machine Casing




Progressive Stamping Frame Part



Die Compensation Auto Pillar



Surface quality, Wrinkle and Scratch

Deep drawing of motorcycle oil panel

**Form-Advisor V3.1 Packages and Modules**

| Ref. | Modules | FA01-V31 Form-Advisor Standard for MCAD | FA04-V31 Form-Advisor Professional | FA05-V31 Form-Advisor professional for Automotive | FA06-V31 Form-Advisor professional for Electronic |
|---|---|---|---|---|---|
| FAP-01-V31 | Form-Advisor Kernel (Can not be soled alone) | ● | ● | ● | ● |
| | Form-Advisor Kernel for MCAD system<br>Advance meshing capability<br>SPW for stamping process design<br>Meshing & Setup modules<br>Powerview for postprocess<br>Job sumitter and monitor | Nots for below:<br>A: Get one only from the list to match the MCAD system<br>B: Get one only from the list for the MCAD ststem | | | |
| ***MCAD*** | | | | | |
| FAM-01-V31 | Form-Advisor for NX | □ A | □ B | □ B | □ B |
| FAM-02-V31 | Form-Advisor for CREO | □ A | □ B | □ B | □ B |
| FAM-03-V31 | Form-Advisor for CATIA | □ A | □ B | □ B | □ B |
| FAM-04-V31 | Form-Advisor for SOLIDWORKS | □ A | □ B | □ B | □ B |
| FAM-05-V31 | Form-Advisor for AutoCAD INVENTOR | □ A | □ B | □ B | □ B |
| FAO-01-V31 | Form-Advisor professional user environment | | ● | ● | ● |
| FAO-02-V31 | Springback Compensator | | □ | ● | □ |
| FAO-03-V31 | Inverse mould for one step | | □ | □ | □ |
| FAO-04-V31 | Stamping Feature | | □ | □ | ● |
| ***Solver*** | | | | | |
| FAS-01-V31 | Standard solver, for 1 CPU(s)/Core(s) | ● | ● | ● | ● |
| FAS-02-V31 | Upgrade Standard solver to multi CPU(s)/Core(s) | □ | □ | ● | □ |

for Agent

## Material Database

Over 300 kinds of traditional stamping materials are integrated, including aluminum alloy, stainless steel, soft steel, HSS & tool steel, all generated from material makers.

Multiple steel indexes are complemented such as JIS, DIN, UN & SEA. User defining is supported without limits.

## Springback Compensation

The powerful dual-solver of Form-Advisor offers both explicit & implicit methods to solving the springback problems. The new generation of solver technology is optimized for different types of processors that the accuracy and work rate touch top attitude.

## Progressive Die

Stamping velocity and multi-stages are the key factors in the progressive stamping field, but small features and high accuracy requirements in progressive die processes needs a more robust and more fast simulation engine.

With parallel calculation shortening the simulation time greatly, Form-Advisor accumulates over 15 years of experiences in the precision stamping field.

## System Advice & Requirements

**O.S.:** *Windows XP (32bits), Vista, Windows 7 (both 32 bits & 64 bits)*
**Processor:** *Intel core i3, i5, i7 and above or AMD 2.0G and above*
**Memory:** *4GB and more memory can get a good performance*
**Display:** *Support1280*1024 and above resolution and 128MB display memory is required.*
**Mouse:** *Three-button engineer mouse is required.*
**Harddisk:** *200GB or above free hard disk space*

DVD-ROM with writable capability for data backup is also an optional.

## About C3P Software

With the combination of software development, advanced analysis, extensive product development experience and cost effective local human resources, C3P Engineering Software International Co., Limited provide industry and manufacturing business with comprehensive solutions and engineering services on a global basis to meet their expectation in high quality, on-schedule delivery within cost target. Our business scope covers software development, professional engineering service and application software integration. More info please visit: www.c3p-group.com | www.cast-designer.com

## Partnerships

Version: FA2012R1301

HONGKONG (Asia Pacific, HQ)

12/F AT Tower
180 Electric Road
North Point, Hong Kong

Tel: +852 2566 8109
Fax: +852 2234 5811
Email: C3PHK@c3p-group.com

NEW YORK OFFICE

9631 Field Stone ct,
Painted post, New York,14870, USA

Tel: +1 607 330 4772
Fax: +1 607 330 4776
Email: C3PNY@c3p-group.com

Maryland OFFICE

3360 North Chatham Rd., Suite L,
Ellicott city, MD 21042, USA

Tel/Fax:+1 410 465 7865
Email:C3PNY@c3p-group.com

SUPPORT CENTER

Unit 603, Info Building,No.111
Science Avenue GSC,GZ, 510663

Tel: +86 20 3229 3257
Fax: +86 20 3205 3354
Email: C3PCN@c3p-group.com