One Model, One Process Environment using DFE and DYNAFORM

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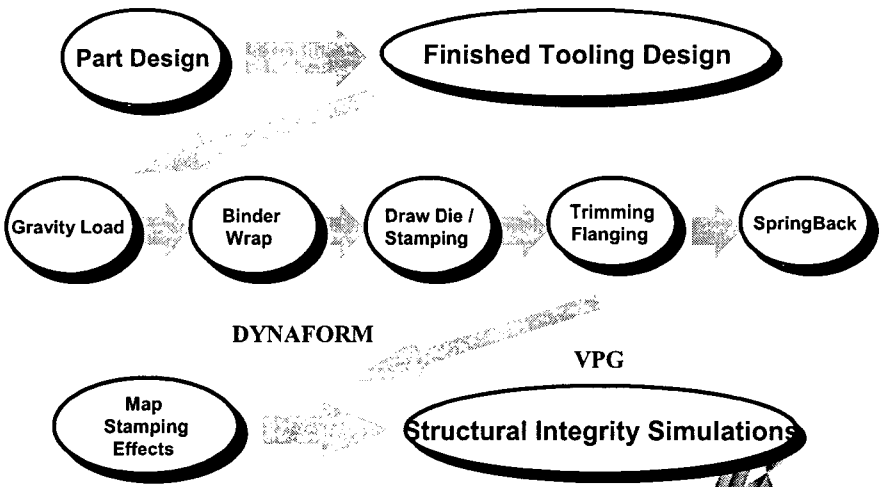
DSTECH 한국시뮬레이션기술(주)

Missing Link ? Die Face Engineering



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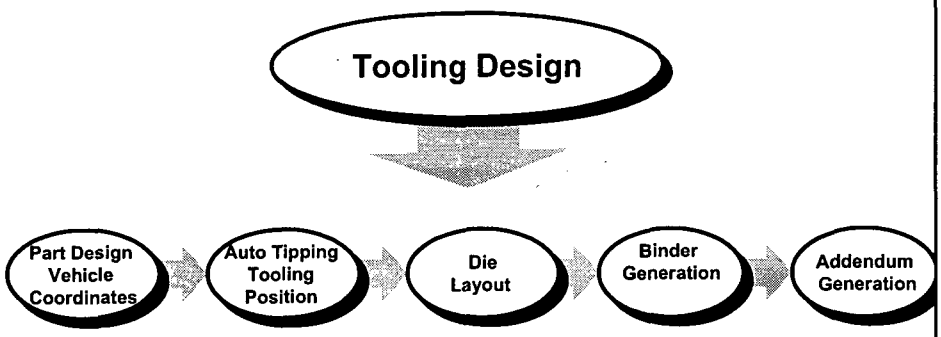
Die Face Engineering Process



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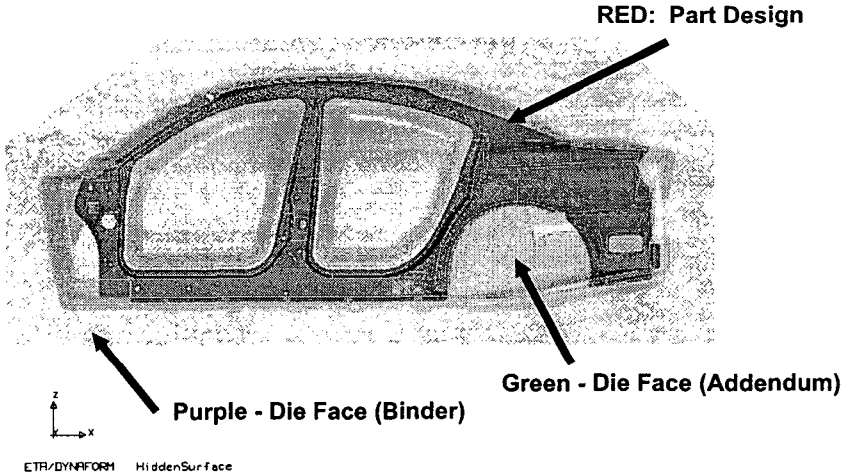

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Software Arrangement

- DYNAFORM is organized into two major modules
  - Stamping Simulation Module (SS)
  - Die Face Engineering Module (DFE)
  - Both (2) Modules can be licensed separately
  - Blank Size Estimation (BSE), must be bundled with SS or DFE
- Generic Features and Functions developed for DFE are added to SS Module
  - Element Fillet Meshing
  - Morphing
- Blank Size Estimation is a separately licensed product to be bundled with DYNAFORM
  - Single Function with One-Step Calculation
  - Requires a special license key

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DFE CAPABILITIES

- Element Fillet Meshing
- Reverse Trimming and Complete Geometry
- Smooth Outer Edge and Boundary Transition
  - Outer Edge Expansion
  - Concave Radius
- Auto Tipping & Morphing
  - Check Under Cut
  - Estimate Draw Depth
- Auto Binder & Morphing
- Auto & Manual Addendum Profile Generation
- Addendum Profiles and Punch Opening Line Morphing
- Generate Surface and Mesh Between Profiles
  - Trim Binder per PO Line
- Unfold Flange, Manual & Auto (To be Delivered)
- Projection of Trim Line to Addendum (To be Delivered)

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DFE Capability Overview

- CAD Surface Based Tool Box – Near NC Quality
  - All DFE operations produce CAD Surfaces (NURBS)
  - All CAD Surfaces can be exported in IGES format
  - Near NC Quality or like-to-like surface quality as the part surfaces imported
- Auto Meshing Available
  - Quad-Dominated Uniform Mesh - suitable for FEA Purposes
  - Variable Size Tool Surface Mesh - suitable for Formability Purpose
- Morphing
  - CAD Surface Based
  - Parametrically Defined
- Auto Addendum Profile Generation
  - Based on the estimation of the material stretch, per One-Step Calculation
- One Code and One Environment – In Bed with DYNAFORM

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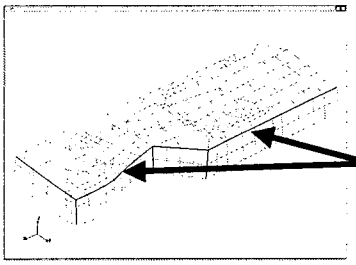
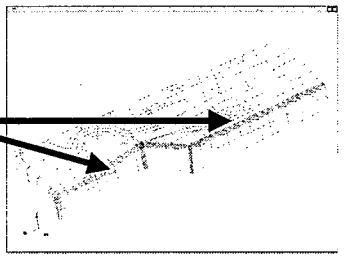
DFE – Element Fillet Meshing

- Element Fillet Meshing Procedure
  - Generate Mesh from the CAD Surface
  - Define the Radius of Character Line, if the Default Value of 45 degree is not adopted
  - Identify the Radius Number and offer a fillet radii, default is 5mm
  - Different fillet radii could be stitched together





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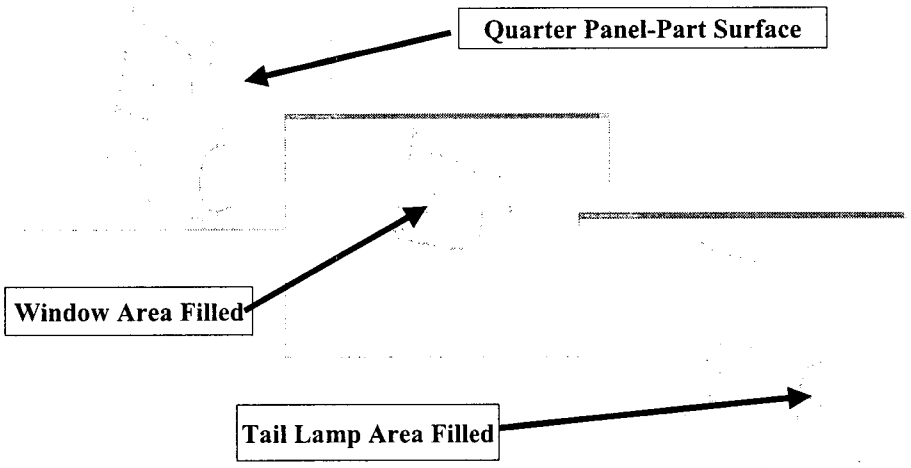
Reverse Trimming or Complete Geometry



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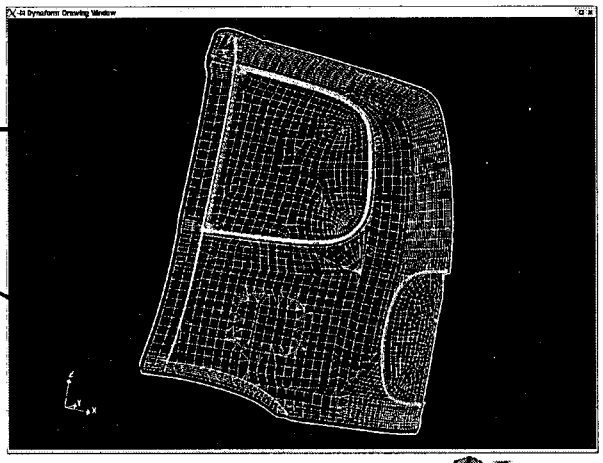
Smooth Outer Edge & Boundary Transition

Expand Outer Edge

To Round Off

Sharp Corners



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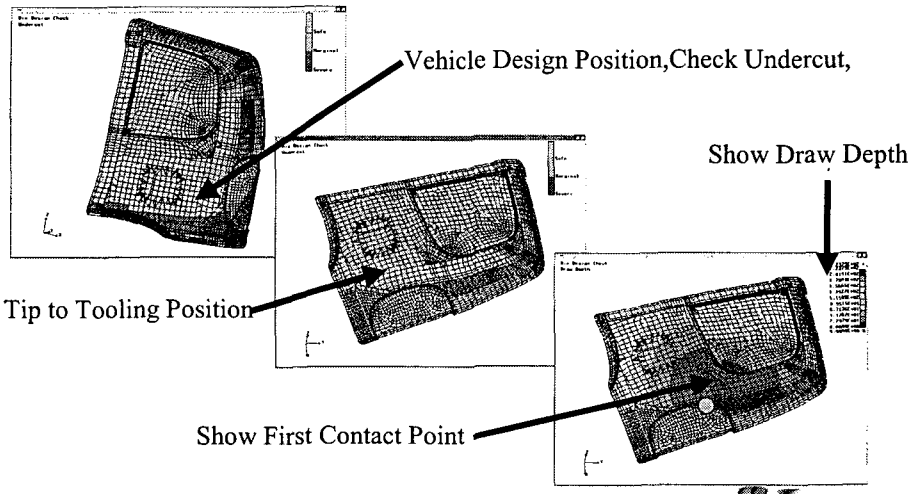
Material Tipping & Morphing



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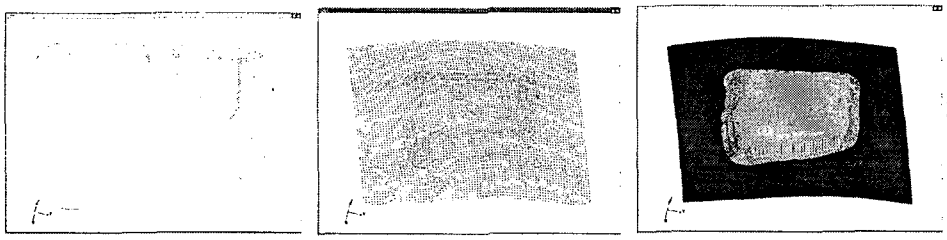
Surface Generation

- Generate Addendum Surface per profiles
- Generate Mesh per Addendum Surface
- Trim Off Binder at PO Line
- Ready for Formability Study



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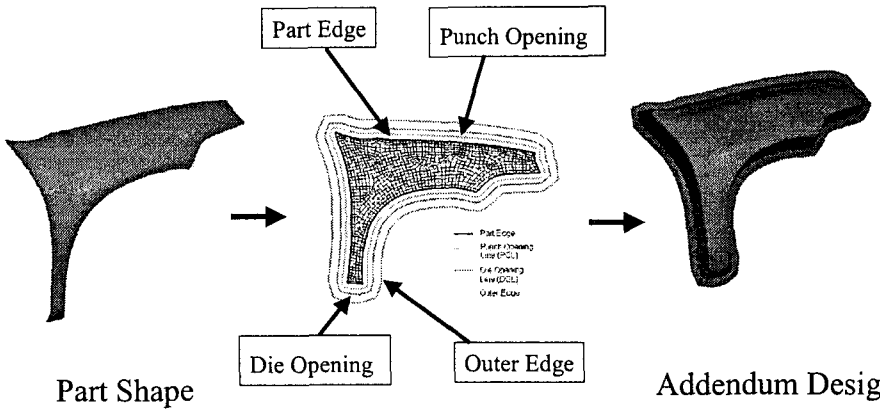
ADDENDUM



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DYNAFORM-stamping simulaton

Objectives

박판성형시뮬레이션에 사용되는 **CAE**를 효과적으로 이용하여 스탬핑 제품의 개발기간을 단축하고져 함

- **CAE**를 이용한 트라이 아웃을 수행함으로서 실제 트라이 아웃을 시뮬레이션을 수행함
- 다음과 같은 금형설계변수를 **CAE**를 통하여 예측하고자 함

– 성형성
– 주름
– 스프링백
– 긁힘 자국
– 성형력 예측

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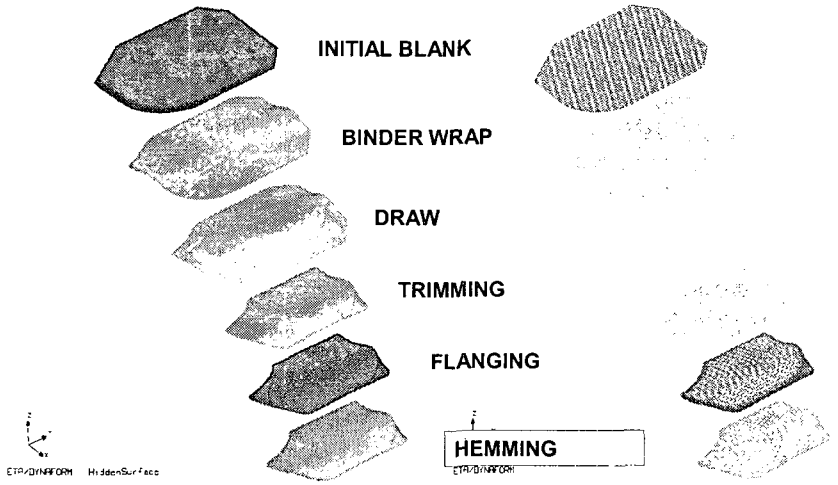
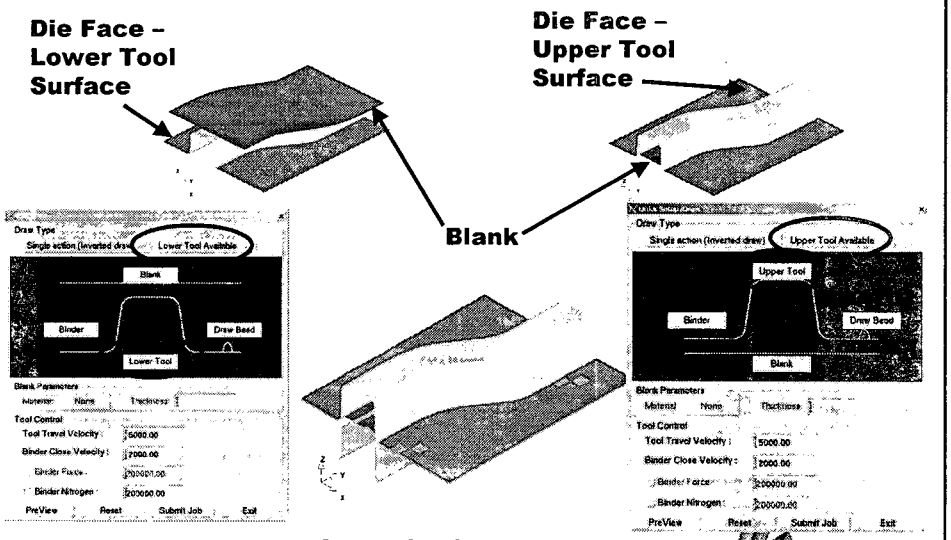
Typical Stamping Processes



DYNAFORM Quick Setup

- Process Guidance Approach
  - Streamlined User Friendly Features & Functions
- Quick Setup for Stamping Processes, DYNAFORM 4.5
  - Gravity Load
  - Draw Die
    - **Crash Form**
    - **Inverted Draw (Single Action)**
    - **Toggle Draw (Double Action)**
    - **Four Piece Draw (Double Action)**
  - Springback
- Quick Setup for Stamping Processes, DYNAFORM 5.0
  - Multiple Stage Tooling
  - Hydroforming

Inverted (Single Action) with Lower Tool



Setup Configuration

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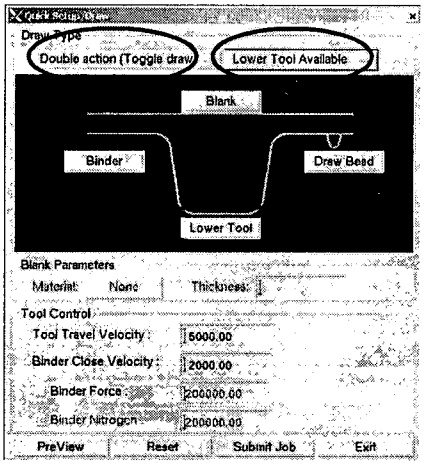
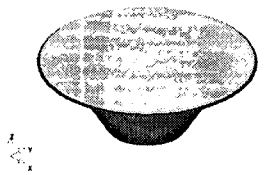
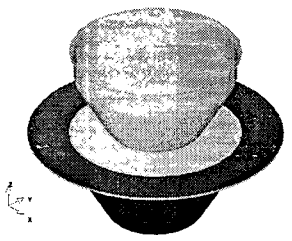
Toggle (Double Action) with Lower Tool





Blank & Tool Face



Setup

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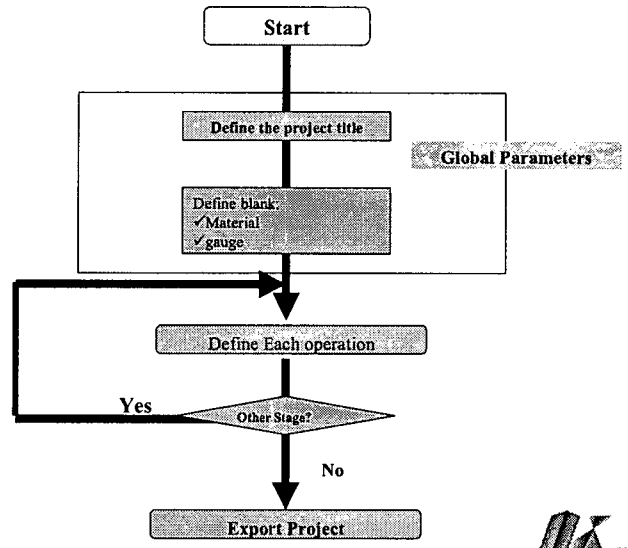
Die Forming - Project Definition Phase



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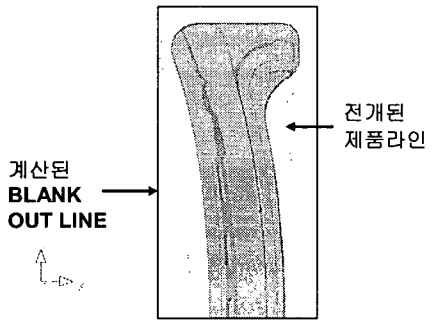
(Estimate)

Blank Size Estimate

제품형상 또는 펀치형상을 토대로 필요한 블랭크 사이즈를 손쉽고 빠르게 예측합니다.



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