Full 3D Automatic Mold Design System Based on NX Proven With Best Practices

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   - Summaries of Proven Success

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1. Introduction
   - Company Overview
   - Background of Our Trials
   - Philosophy of Developments
1. Introduction
   - Company Overview
     - SIEMENS AP Platinum Partner
       - Specialized in DM/CAE/PDM also NX
     - Four offices nationwide
       - SEL(HQ) / Kunpo / PUS / ULS
     - Competitive R&D Center
     - More than 10 biz. Partners
     - Successful supports for ME&S
     - Sincere SRs and Technical Consultants
     - Futuristic Strategy Planning & Marketing forces

2. Business Fields
   - Solution Business
     - CAD/ CAM/ CAE/ TC/ TMX
   - Consulting Business
     - PDM/ IT/ SI/ CAE/ DM Projects
   - New Business
     - Micro Tensile Tester / Micro Press System
1. Introduction
- Company Overview

- Providing excellent solutions with outstanding consulting services, glowing with customers

- Technology Leadership

- Consulting Business
  - CAE Consulting (Optimization)
  - Engineering Consulting
    (Product Development & reverse engineering)
  - PLM Project (DM/ PDM/ IT Development)
  - CRM/SCM/CPC Web based collaboration system

- Solution Business
  - NX/ NASTRAN/FE MAP/TC/TMX
    SIEMENS(SIEMENS: PLM)
  - RecurDyn (FunctionBay: MFB D)
  - T-Mold, T-EDM(SPACE solution Inc.)
    : Mold Design Application in NX
  - MAGMA (MAGMAsoft: Casting)
  - TOSCA (FE design: Optimization)
  - Others
1. Introduction
   - Background of Our Trials

   - NX Mold Wizard has been recognized as a good tool. However, the ASIAN market require more suitable wizard built on NX

   - Customers’ Common Requirements
     - Practical performance in productivity
     - Localized & effective Database system management
     - Less dependency of personal capabilities in maintaining competitive mold design qualities
1. Introduction
- Philosophy of Developments

- Assumptions based on V.O.C
  - Hard to hire experienced technical HR
    - *Strict process wizard has limits*
      - System errors (sometimes, seems disasters)
      - Deep understanding of mold design process: Crucial
  - Specified design environments/ cultures
    - Getting shorter lead time strongly requested
    - Rare compensation for additional design labor due to specification changes
    - Localized Mold Base system (frequently used)
  - Needs for Speedy/ Automated/ Verified/ Robust/ Full 3D system
2. Special Features

- Intuitive GUI / Command system
- Easy parting functions
- Various supporting utilities
- Library of MOLD BASE
- Library of Standard Parts
- Direct core replacement design
- High quality drafting
2. Special Features
- Intuitive GUI/Command system

- Based on mold design experiences and requests from customers, effective graphic user interface and commands are provided.
2. Special Features
- Easy Parting Functions

- Easy: only 2 hours training is enough
- Small data handling: not using assembly, but applying parts
- High Speed: parting with non-parametric basis (less design error)
2. Special Features
- Various supporting utilities

- More than 300 commands (*.dll) through whole mold design process

- Main Parting in NX
- Insert Core automatic separation
- Insert Core Head area automatic creation

- Hole CAM Data
- Automatic P.O (material)
- Gun Drill CAM Data
- 3D Measurement Data
- In-house Customization

- diverse CAM Data automatic generation
- 2D Drafting
- Full 3D mold design
2. Special Features
- Library of Mold Base

- Various Mold Base Type provided (include non-standards)
- Specialized mold design supported
2. Special Features
- Library of Standard Parts

- More than 900 standard parts in various size range
- Flexible standard part enrollment system

- Creation of user define parts
- Creation of Module parts
- Flexible sizing features
- Stable standard parts
- Speedy creation of parts
2. Special Features
- Direct Core Replacement Design

- 70~80% of time can be reduced in similar product design
- Applicable product: Mobile phone / Monitor / TV sets / etc.
2. Special Features
- High quality drafting

- Strong requirements from ACAD users
- 100% compatibility with ACAD including frequently used characters
3. Success Stories

- Achievement Summary
- CASE 1 : ASPIC
- CASE 2 : NAMDO MOLD
- Summaries of Proven Success
3. Success Stories  
- Full 3D Mold Design Project

- Minimum project required within 3 Months including specialized consulting service and training to ensure a success

## Previous Environment

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<th>Library</th>
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<th>User Customization: Mold Base &amp; Standard Parts Library creation</th>
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- User Customization (Design/ Manufacturing/ ETC.)
- Debugging - Difficult !!!

## T-MOLD

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- Customize
- Debugging

Full 3D Start

Success!!!
3. Success stories
- Achievement summary

- Prompt adoption & application after consulting and training
- Average mold design time reduction: 30~50% in six months
- 99% reduction in design errors
- Speedy skill-up in six months
- 70~90% time reduction in core replacement method
- 100% proved success even in customers having previous unsuccessful experiences
3. Success Stories
- CASE1 : ASPIC

- Successful project completion in FY2007 with strategic support of high levels.

**Project Background**
- Lots of repetitive tasks
- Work environment reformation
- Minimize meaningless errors
- Reduce design lead time

**Project Goals**
- Unification of Design Tool : NX
- Paperless in Workshop
- Zero Design Error
- Part Standardization
3. Success Stories
- CASE1 : ASPIC

- Project schedules & detail tasks performed

- Usage Training (2 Wks.)
  - NX & Core Parting
- T-Mold Training (2 Wks.)
  - Based on Full 3D Design Process

- Core Parting
- Full 3D Mold Design
- Paperless Machining System
- 2D Drafting after Full 3D
  - Concept Design Applied
  - from out-sourced drawing
  - Minimize the essential information on 2D drawing

- Full 3D Mold Design for New Product
- Part Standardization Process
- T-Mold Customization (Upgrade for ASPIC)
- Set-up Paperless system for 2nd Tier
- Training for machining departments for 3D system

- Project Period : 2007/5/21 ~ 2007/8/31 (3.3 Months)
- Consultants : PM (1) / Senior Consultant (3) / Code developer (1)
3. Success Stories
- CASE1 : ASPIC

Better performance with new approach

<table>
<thead>
<tr>
<th>NO</th>
<th>Product Name</th>
<th>Customer</th>
<th>Designer (Experience)</th>
<th>Item #</th>
<th>Design Method</th>
<th>Error #</th>
<th>Man Day</th>
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</table>
3. Success Stories
- CASE1 : ASPIC

- Reduce design time: from 10 MD to 5 MD
- With zero design error
3. Success Stories
- CASE1 : ASPIC

- Reduce design time: from 14 MD to 8 MD
- With zero design error
### 3. Success Stories - CASE 2: NAMDO MOLD

**Mold Product Field**
- High Tech/ Appliance (Refrigerator/ Washing Machine/ Vacuum/ Printer/ Etc.)
- Automotive compartments
- Stack Mold

**Support Since | Legacy Design Process | Current Process | Total Support | 3D Design Outcomes**
--- | --- | --- | --- | ---
FY 2006 | 2D Drafting (AutoCAD, partial NX) | T-MOLD Application NX Based Full 3D | 20 Months | 500 Pairs

<table>
<thead>
<tr>
<th>Item</th>
<th>2D Design</th>
<th>After Project with 3D</th>
<th>Achievement</th>
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<tr>
<td># of Design Resource</td>
<td>11</td>
<td>7</td>
<td>36% reduced</td>
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<tr>
<td>Design Amount/ 1 yr.</td>
<td>250 Pairs</td>
<td>300 Pairs</td>
<td>20% Increased</td>
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<tr>
<td>Design Errors</td>
<td>AVG. 5/ 1 Mold</td>
<td>AVG. 0~1 / 1 Mold</td>
<td>80~100% reduced</td>
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<tr>
<td>Averaged Design Time</td>
<td>13 Days</td>
<td>7~8 Days</td>
<td>35~45% reduced</td>
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<td>Time to designer from novice</td>
<td>24 Months</td>
<td>4 Months</td>
<td>83% decreased</td>
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</table>
3. Success Stories
- CASE 2: NAMDO MOLD

- Superb improvements in all performance indexes

<table>
<thead>
<tr>
<th>Design Quality (Errors &amp; Time)</th>
<th>Human Resources</th>
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<tr>
<td>4 Cases 13 Days</td>
<td>Experienced 11 Designers</td>
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<tr>
<td>Full 3D Design After Project</td>
<td>Novice: 4</td>
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<tr>
<td>Almost zero</td>
<td>Adv.: 3</td>
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<td>Design Error #</td>
<td>Period: Novice to designer</td>
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<tr>
<td>Design Time</td>
<td>Around 4 Months</td>
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</table>

- 2D Design Process
- Full 3D Design
- Technical Resource Structure
- Period: Novice to designer
3. Success Stories
- CASE 2 : NAMDO MOLD

- Reduce design time: from 13 MD to 7 MD
- With zero design error
3. Summaries of Proven Success
   - Customers List

More than 40 customers with outstanding ROI & currently more than 20 companies doing pilot projects with this system

1. Hi-Tech Suppliers

   - SAMSUNG
   - SAMJIN LND
   - KUMNUNG Precision
   - ASPIC
   - P&TEL
   - YUJIN M PLUS
   - SAMWON Precision Mould MFG.
   - DUCK SHIN
   - YUKYUNG Precision
   - Son & Arc
   - SHINIL MOLD
   - EYUNSUNG Precision
   - JANGWON
   - KS Trading
   - CHANG SUNG Precision
   - JUNGANG FIT

2. Automotive Suppliers

   - Woosung Precision
   - RAYGEN
   - NAMDO Mold
   - Jungwoo IT
   - ASAN Precision
   - Jaeyoung MTS
   - MIJU Precision Co.
4. Conclusion & Further Plan
4. Conclusions & Further Plan

- Amazing successful outcomes from
  - Serious understandings of V.O.C and ourselves as users
  - Development (system implementation) skills
  - Paradigm shift or change to Selective Parametric concepts
  - Tight co-work/partnership with customers through various projects experiences

- Further considerations & plan
  - Connect current final stages of application (automatically generated P.O. table) to specialized community portal
  - Provide more customization functionalities for user’s own environment to help internal KMS in mold design division