

Moldex3D Users' Meeting - Italy 2016

Friday, Jun 24
Golf Club Lecco



Moldex3D

Designer BLM Mode

Moldex3D
John LIN

2016 Users' Meeting Italia

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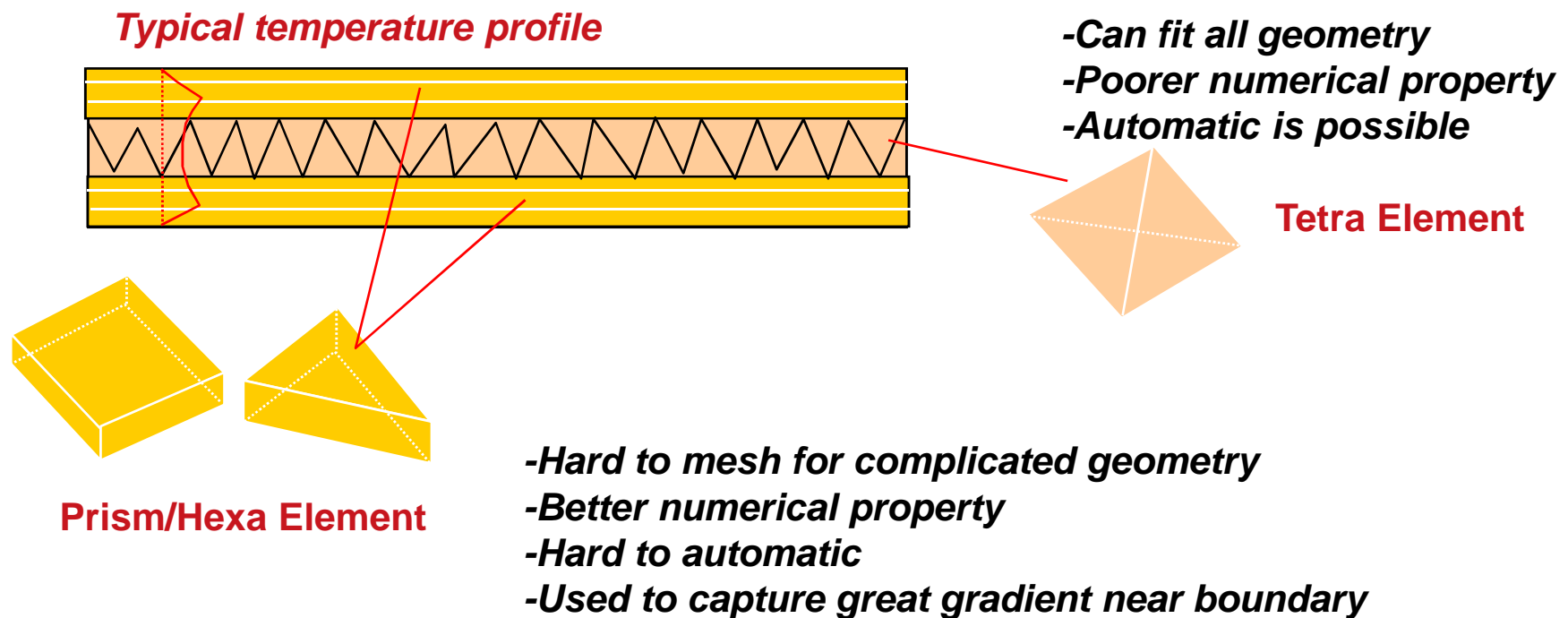
MOLDING INNOVATION

Outline

- > **Introduction**
- > **Feature and Benefit**
- > **Live Demo**

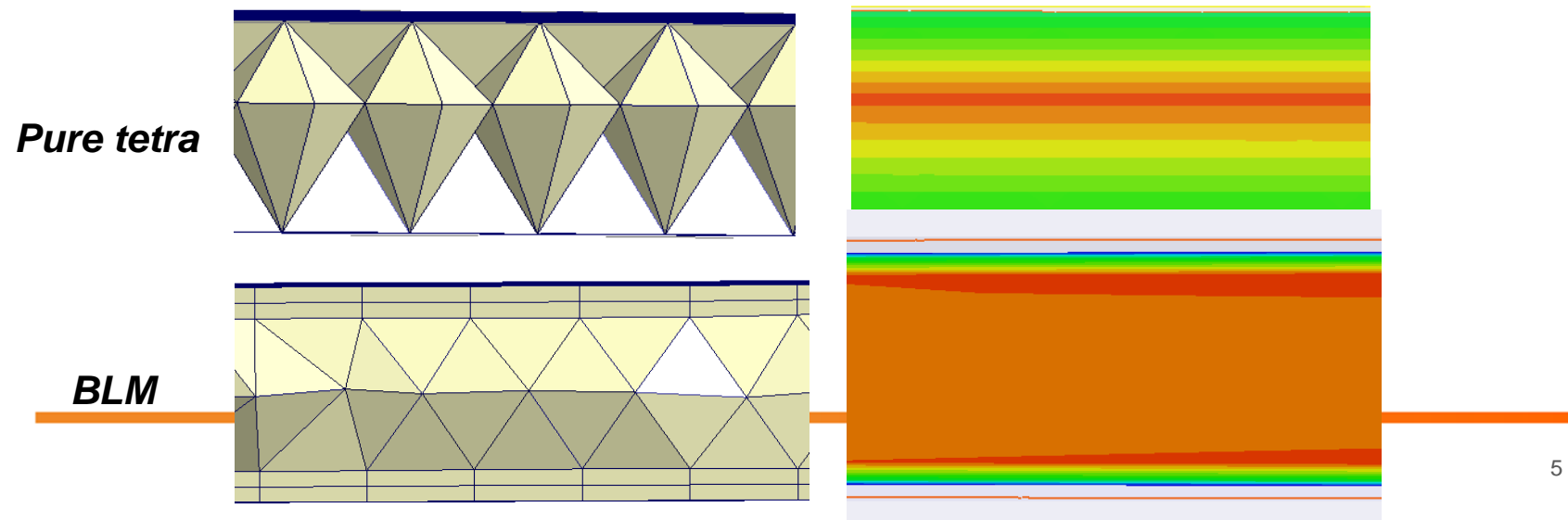
Introduction

- > BLM: Boundary Layer Mesh
 - One, two or three layers of prism mesh on Boundary
 - Inner layer: Tetra mesh



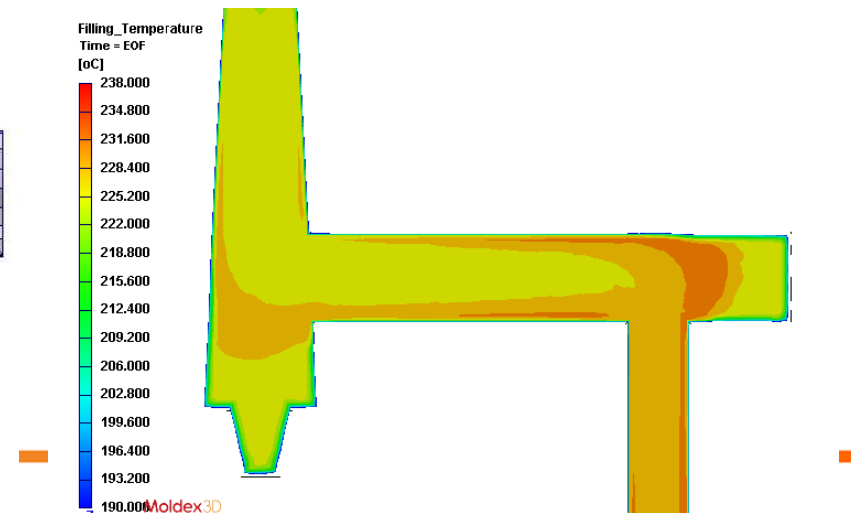
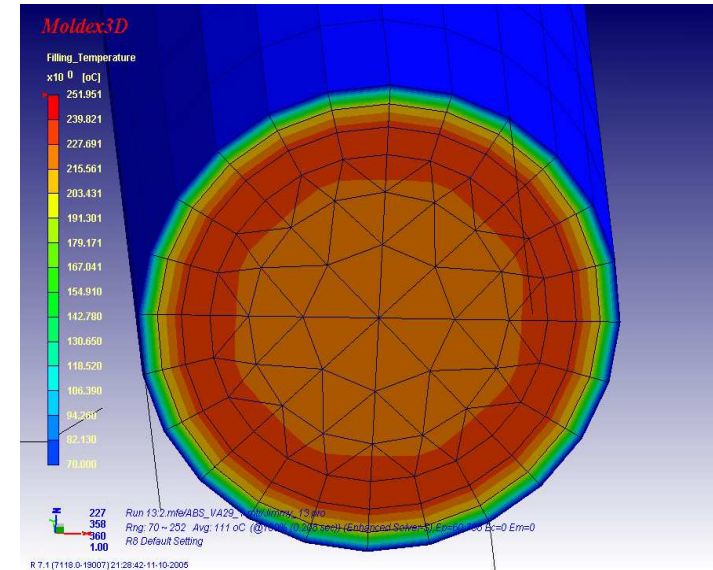
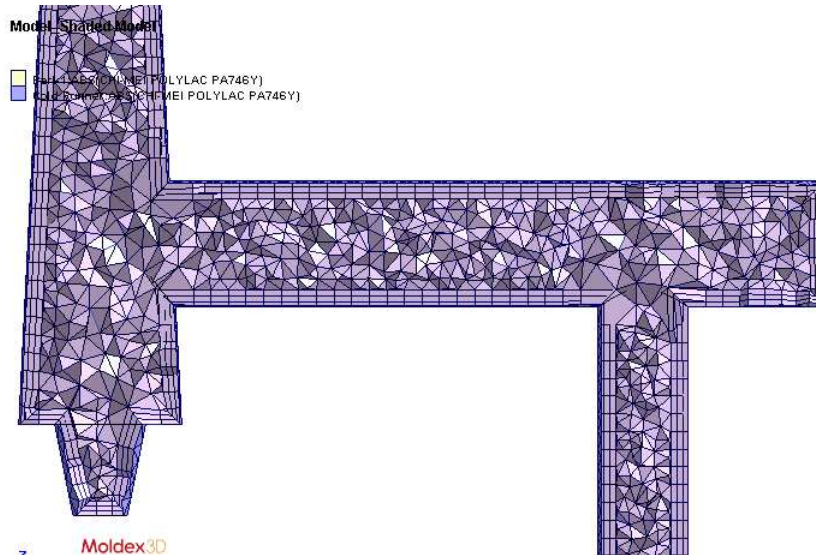
Why is BLM

- > Captures:
 - Strong shear thinning effects
 - Viscous heating effects
- > Enhances the accuracy of:
 - Viscous heating result
 - Pressure result
- > Improves:
 - Warpage/Deflection prediction

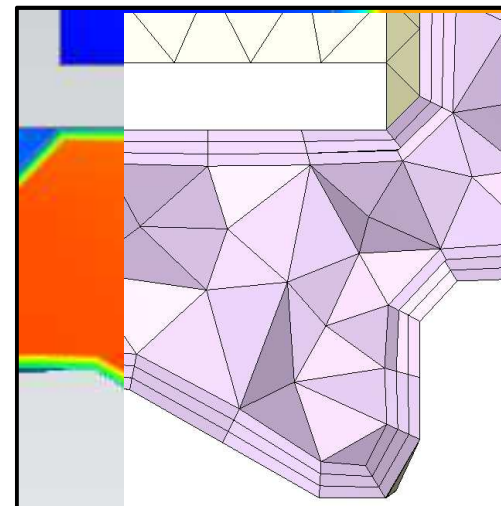
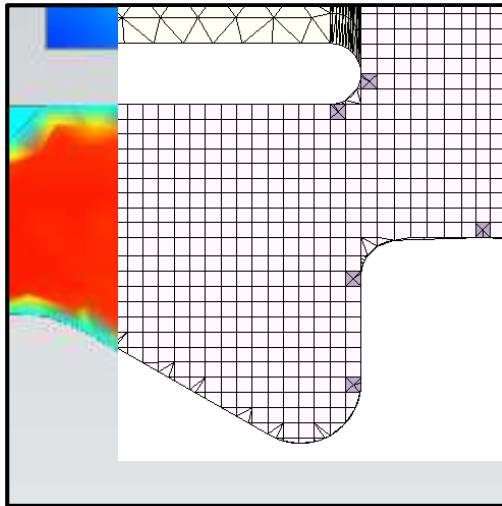
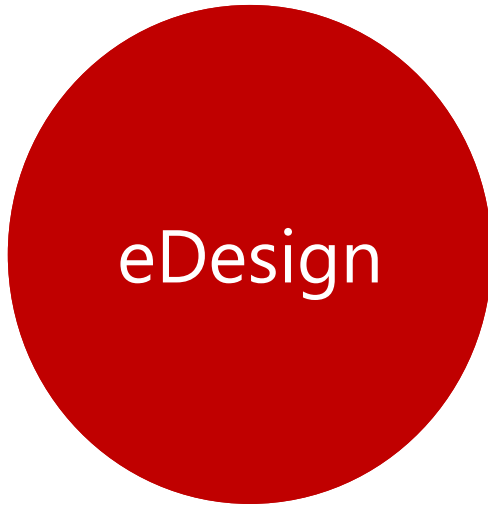


Accurate Temperature Resolution in Runner System **Moldex3D**

- > Accurate viscous heating calculation is crucial in achieving reliable multi-cavity simulation results.
- > High accuracy is achieved by utilizing Moldex3D's true 3D runner.
 - This can NEVER be done with 1D runner

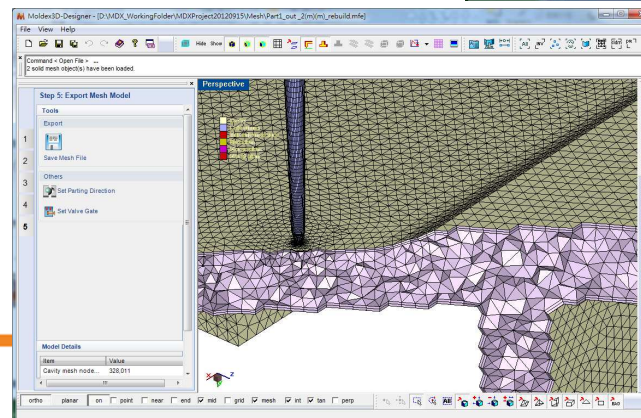
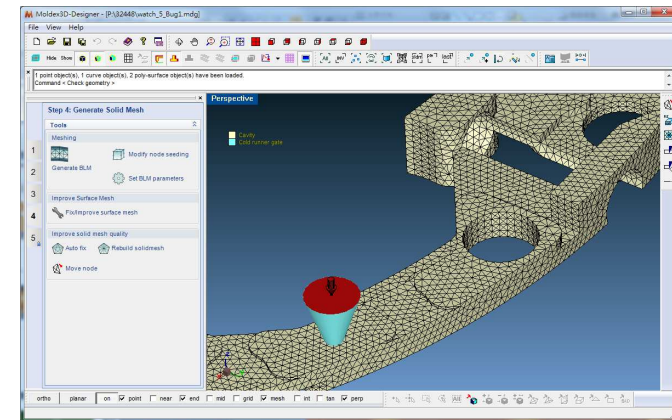
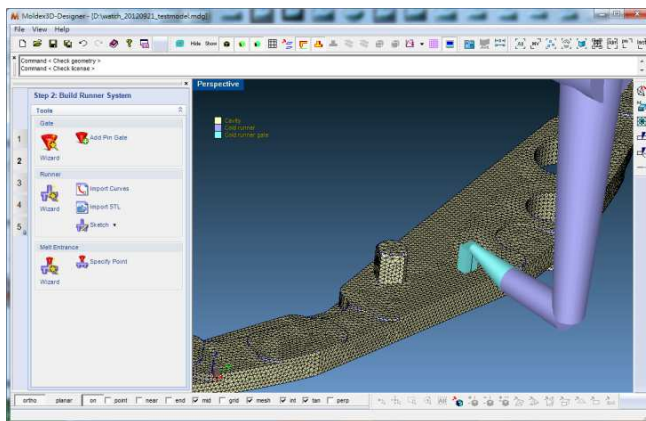


What is Designer BLM mode



What is Designer BLM Mode

- > BLM mode is an embedded application in Moldex3D Designer
- > Provides advanced auto and semi-auto meshing functions
- > The main difference between BLM Mode and eDesign Mode is the solid mesh type
- > Supports 3D CAD data



Designer BLM Supported Modules

	R13	R14	R15 (on plan)
Standard Injection Molding			
Flow	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pack	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cool	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Warp	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Multi-Component Molding	Beta	<input type="radio"/> (Non-matching)	<input type="radio"/> (Non-matching)
Solution Add-on / Thermal			
Advanced Hot Runner	X	<input type="radio"/>	<input type="radio"/>
3D Coolant CFD	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solution Add-on / Special Molding Process			
Compression Molding	Beta	Beta	<input type="radio"/>
Injection Compression Molding	X	X	<input type="radio"/>
Powder Injection Molding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gas-Assisted Injection Molding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Water-Assisted Injection Molding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Co-Injection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bi-Injection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Microcellular	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
RTM	X	X	Beta
IC Package	X	X	Beta

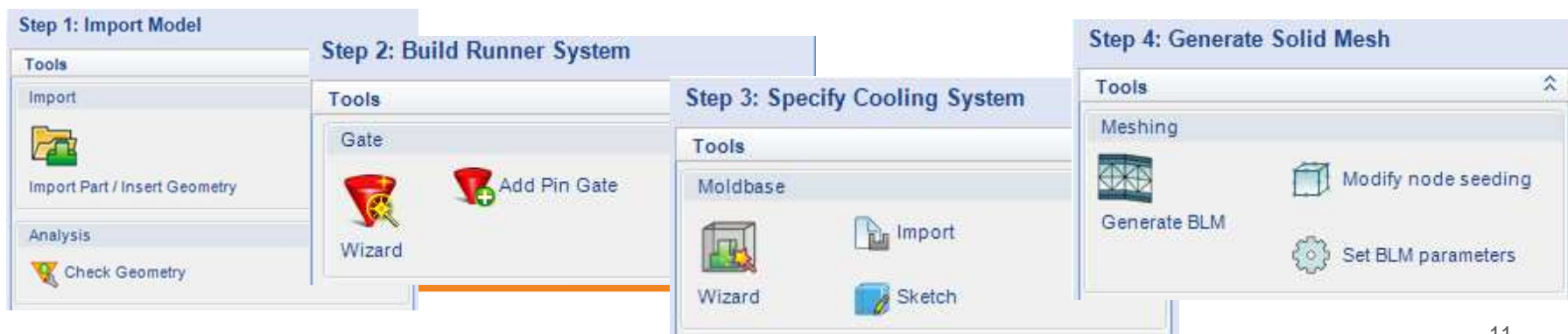
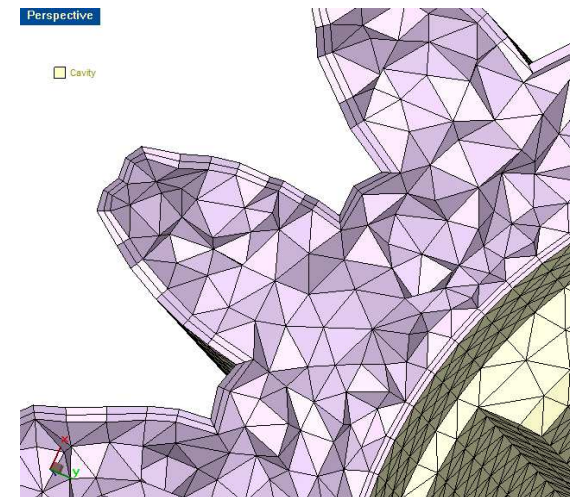
Features and Benefit

Benefits of BLM Mode

- > Ease of use
 - Workflow similar to Moldex3D eDesign Mode
 - Short learning curve

- > High resolution mesh
 - Boundary-fitted mesh
 - Fine mesh for viscous layer

- > High accuracy prediction



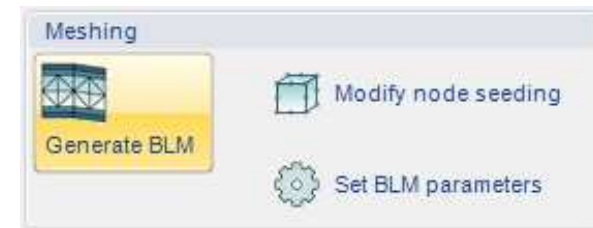
What BLM Mode Bring?

> **Functionality**

- **Boundary layer mesh generator**
- **Manual repair tool for surface mesh repairing**

> **Integrated command**

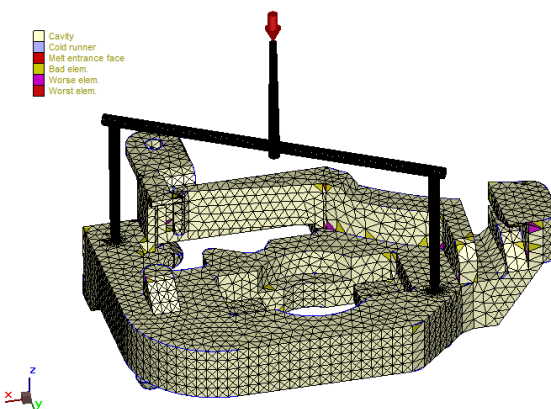
- **Minimize user operations**
- **One button to generate solid mesh for whole system**



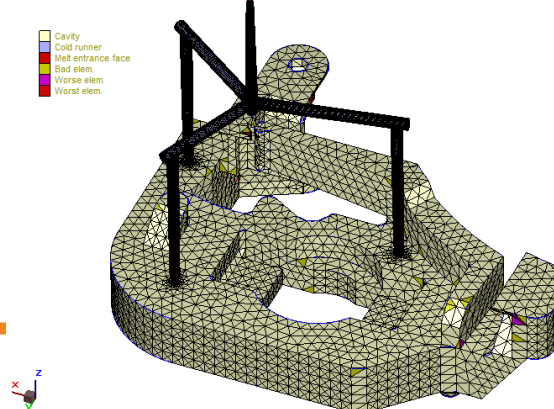
> **Easy to design change**

- **No-sweating gate location change**

Perspective

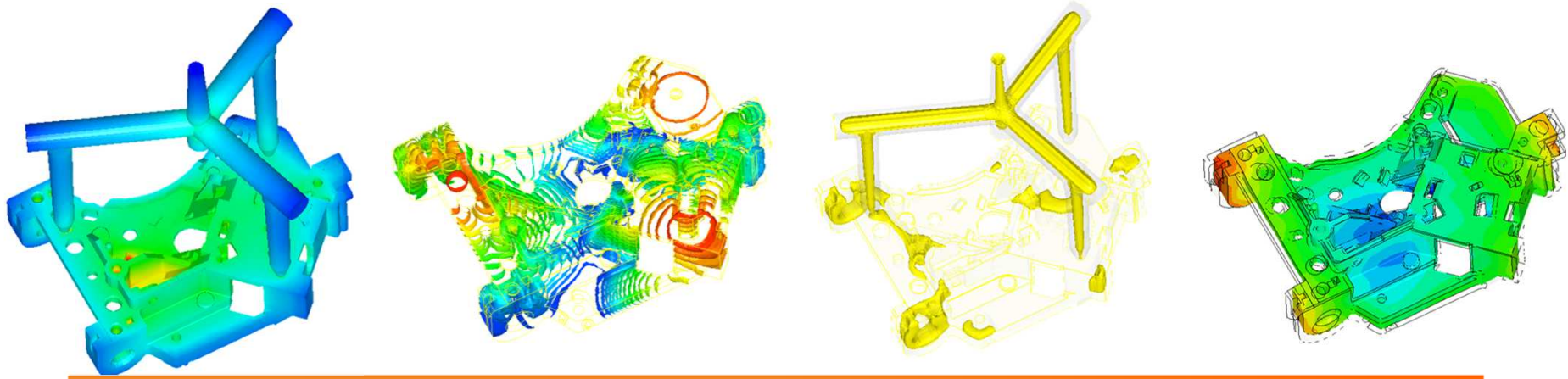
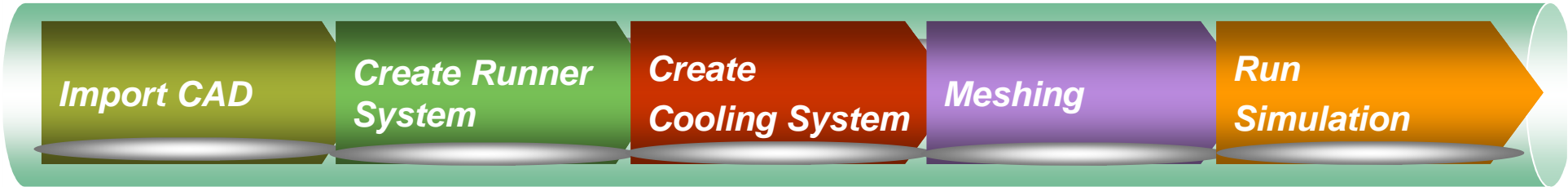
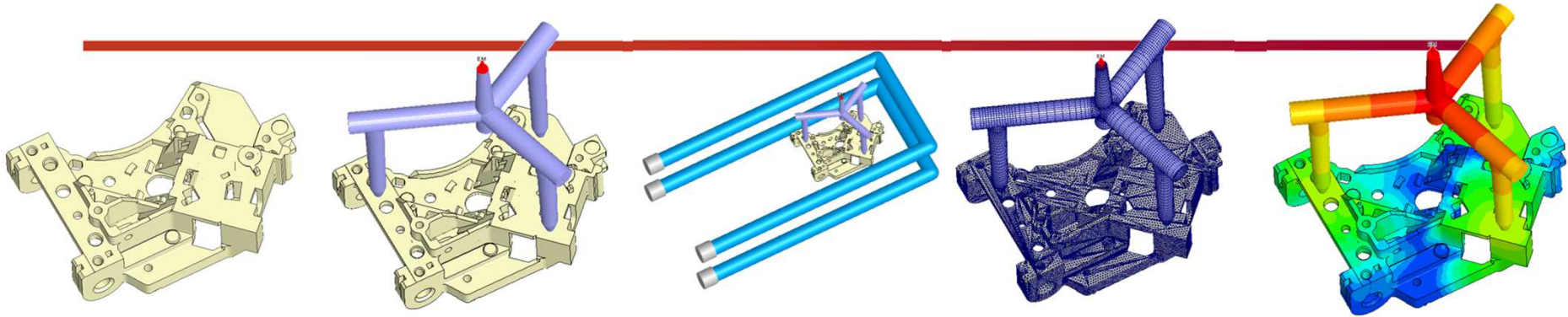


Perspective



Rapid True 3D Design Verification Tool

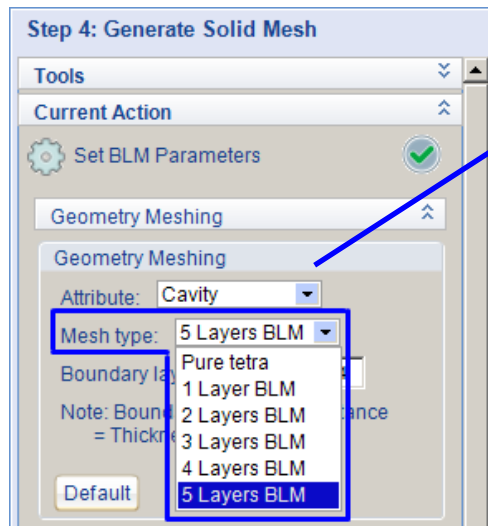
Moldex3D



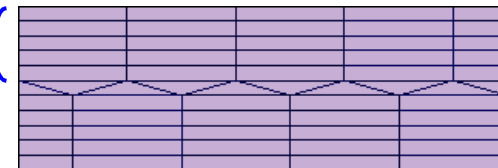
- > However, the construction of mesh for different product geometry is the major difficulty
 - 80% man-hours are spent in constructing the mesh
 - Construction time and mesh quality are highly dependent on users' experience.



- > Up to 5 layers BLM supported in BLM parameter setting
 - Support mesh of part, part insert, runner and cooling channel
 - Improved from 3 BLM layers in R13
- > **Benefit**
 - Enhance analysis accuracy by increasing mesh resolution in thickness direction without extra effort and quality concern



5 Layers BLM {

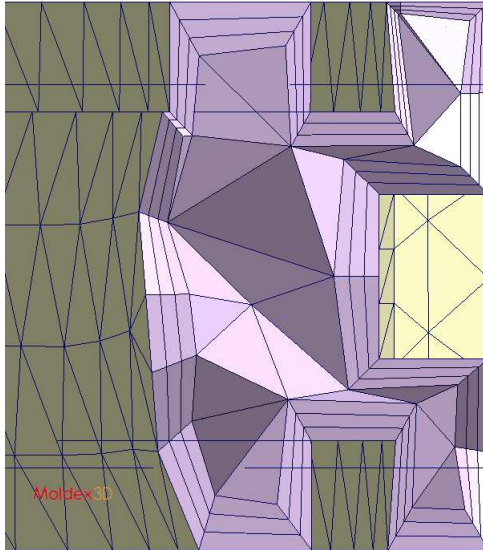


	Designer BLM					
Mesh Type	Pure Tetra	1 Layer	2 Layers	3 Layers	4 Layers	5 Layers
Layer Count	1 ~ 2	3	5	7	9	11
R13.0	⊙	⊙	●	⊙	n/a	n/a
R14.0	⊙	⊙	⊙	●	⊙	⊙

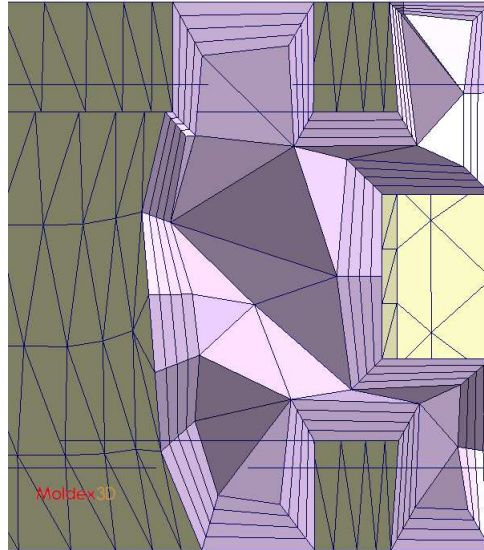
●: default setting; ⊙: supported option

New Generation of 3D Mesh Technology (con't)

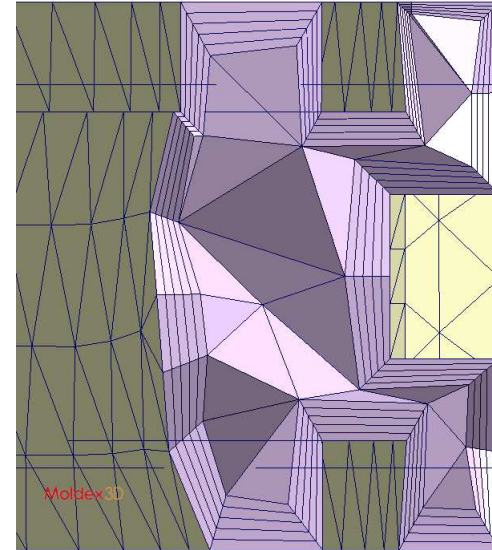
3 Layers BLM



4 Layers BLM



5 Layers BLM



Geometry Meshing

Attribute: Cavity

Mesh type: 3 Layers BLM

Boundary layer offset ratio: 0.4

Note: Boundary layer offset distance = Mesh edge length*offset ratio

Default

Geometry Meshing

Attribute: Cavity

Mesh type: 4 Layers BLM

Boundary layer offset ratio: 0.4

Note: Boundary layer offset distance = Mesh edge length*offset ratio

Default

Geometry Meshing

Attribute: Cavity

Mesh type: 5 Layers BLM

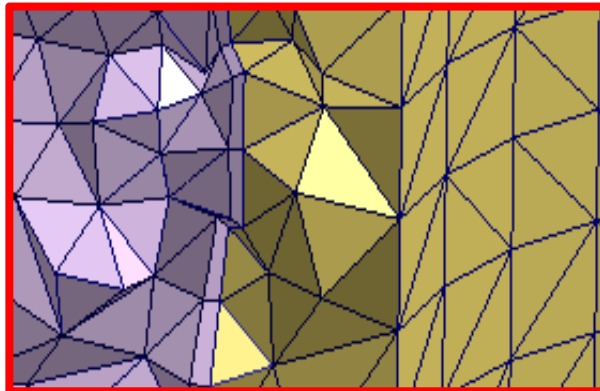
Boundary layer offset ratio: 0.4

Note: Boundary layer offset distance = Mesh edge length*offset ratio

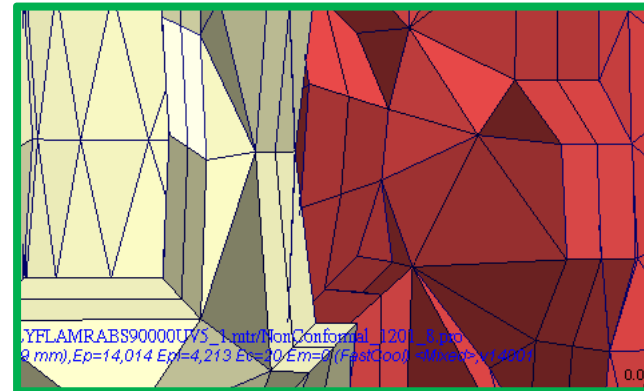
Default

Non-matching Mesh

- > Support non-matching mesh topology on the contact faces between part and part insert
- > **Benefit**
 - No need to match the contact face mesh so making the mesh for part insert becomes easier and less time consuming



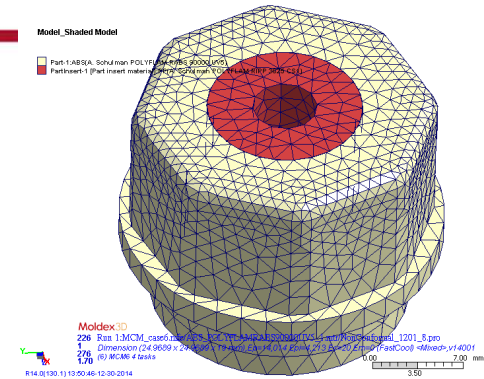
Matching Mesh



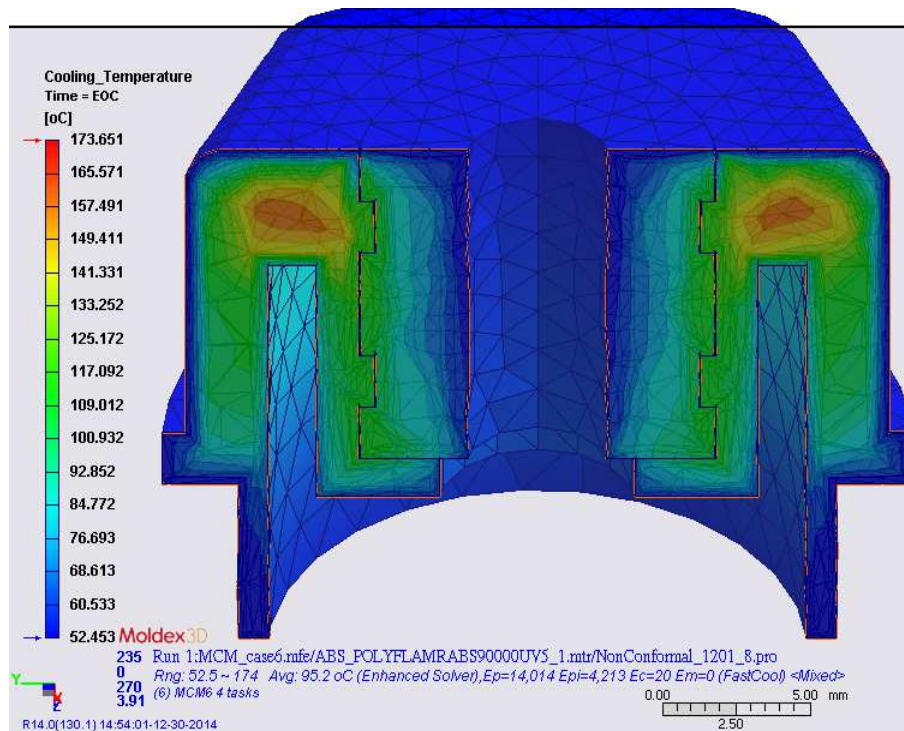
Non-Matching Mesh

Non-matching Mesh

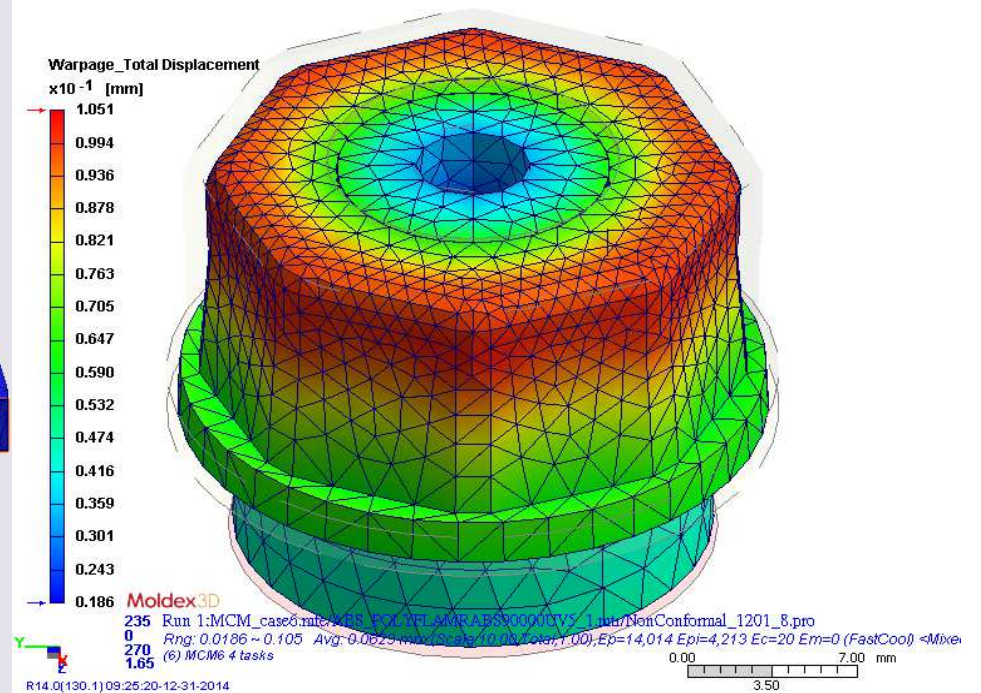
- > Support full analysis items including F/P/C/W
 - Continuous temperature distribution cross the non-matching mesh boundary
 - Continuous deformation cross non-matching mesh boundary



Cooling analysis / Temperature

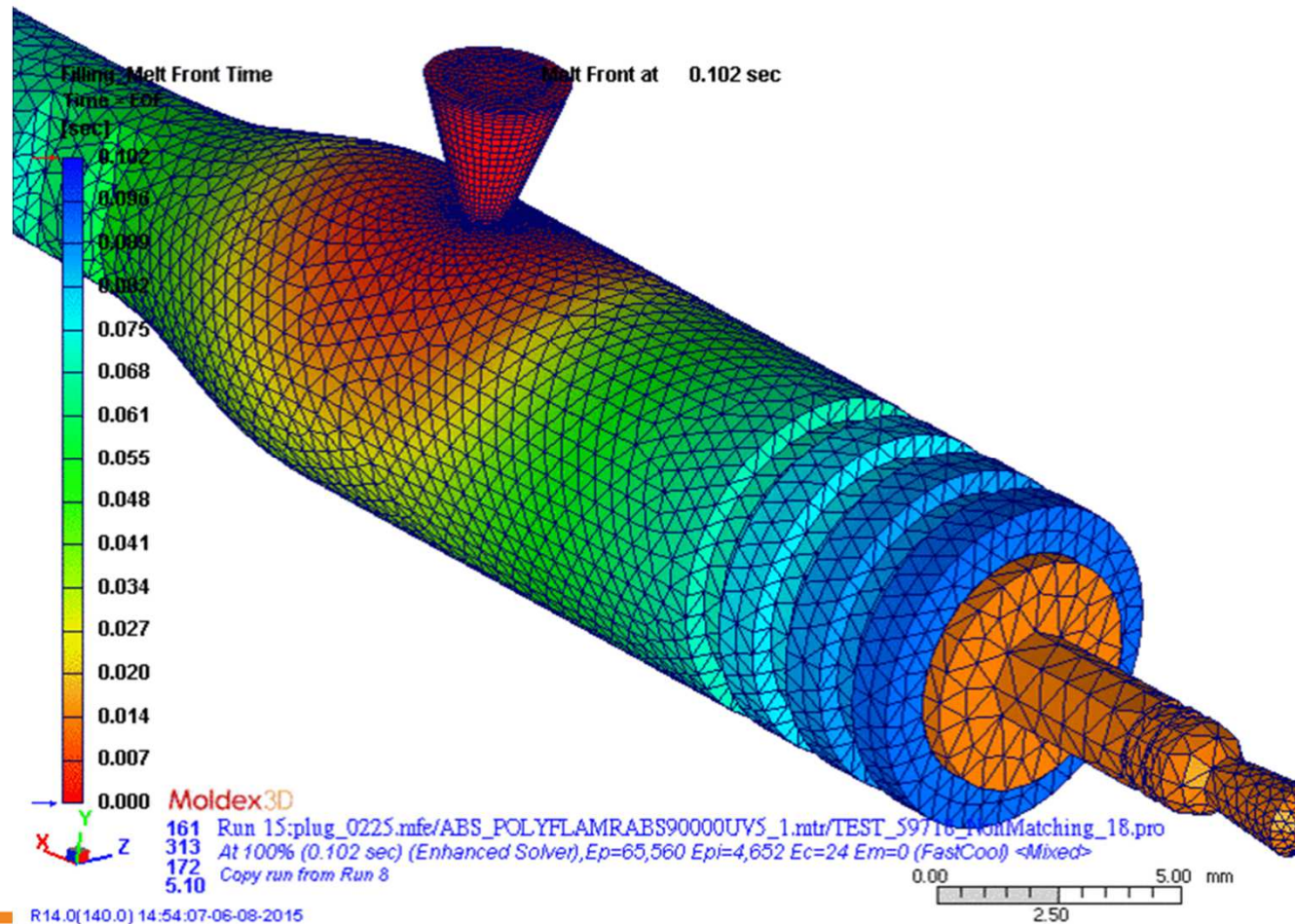


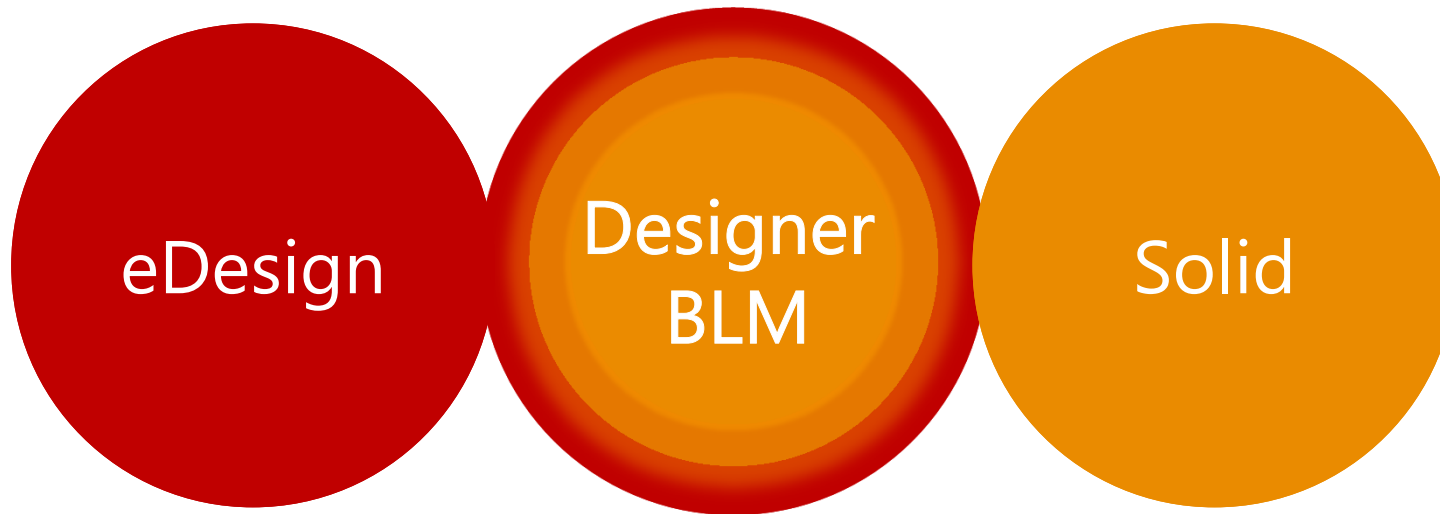
Warpage analysis / deformation



Non-matching Mesh

- > Support Fluid Structure Interaction (FSI) analysis





Provide an easier workflow as eDesign

Enhance analysis accuracy with boundary layer meshes

Reduce largely time cost for simulation

Use non-matching mesh technique for MCM

Ready for WAIM, GAIM, Bi-injection, Co-injection molding process

Live Demo

Moldex3D

Thank You



MOLDING INNOVATION