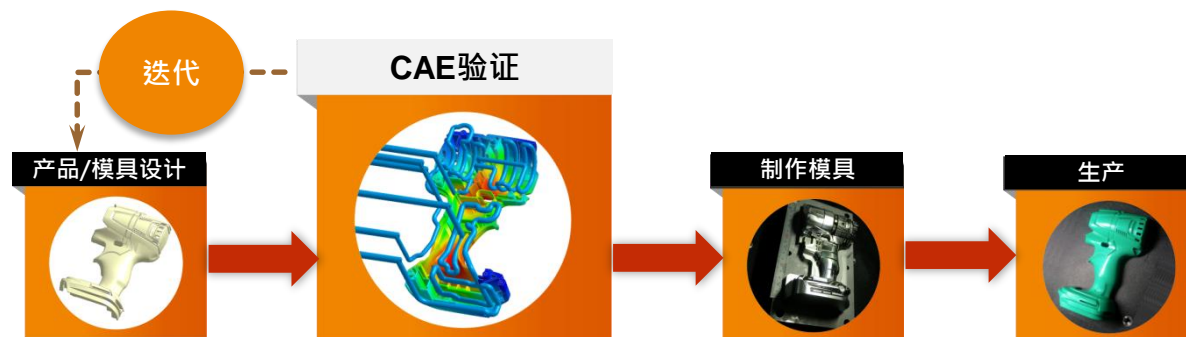


全球模流分析技术的应用现况与最新发展

杨文礼
科盛科技

What We Do

- > 针对各种不同制程需求提供因应的解决方案
- > 利用计算机仿真技术验证产品缺陷，在量产前实时发现成型问题，以更有效率的方式来优化设计，取代传统试务法，有效降低废品率和能源耗损，带给客户更完善的绿能科技



- > 大幅减少开发周期，缩短上市时程
- > 与客户建立长期的友好关系，实时性的支持，从设计、建模、参数设定、仿真分析到制造，提供完整的咨询服务，协助客户解决问题，提升制程生产力

全球服务据点



- > 成立于1995年
- > 全球总部与研发基地位于台湾新竹
- > 240位全球员工，100多位研发人员
- > 全球渠道商共160家

科盛科技全球材料实验室



Rheograph RG25
Capillary viscosity and thermal conductivity with counter pressure equipped



CR-6000
Capillary viscosity at different temperature and shear rates



pvT-6000
pvT change at different temperature and pressure



MCR 502
Rotation and oscillation tests for viscoelastic properties



DSC 8500
C_p, Transition temperatures, crystallization kinetics

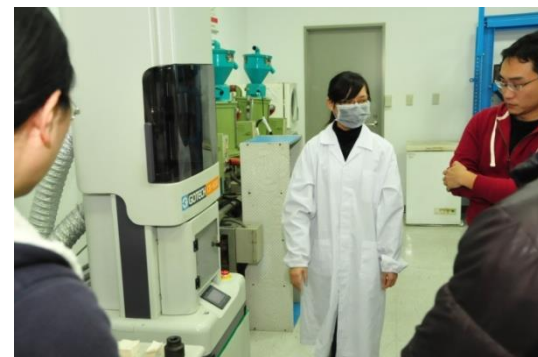


TMA 4000
CTE, Transition temperatures



Instron 5966
Mechanical properties

科盛科技全球材料实验室



2014年美国能源部轻量化材料研究与发展报告

- > 参与美国政府计划，分享案例验证结果
- > 此份报告再次证明科盛科技在模拟分析上的准确性



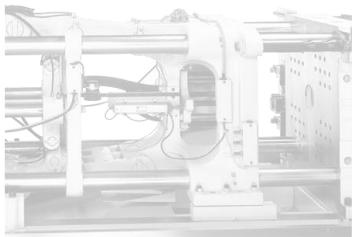
IV.5 Predictive Engineering Tools for Injection-Molded Long Carbon Fiber Thermoplastic Composites—Oak Ridge National Laboratory

ORNL is mainly responsible for generating and distributing experimental data, generated using proven measurement techniques, and coordinating the project. Ford Motor Company is responsible for system specification and weight-reduction analysis. BASF and PlastiComp are preparing and supplying materials for the project and will assist with part molding. ASPN/Minco and BASF are responsible for molding the final part. The University of Illinois will assist by supporting model integration with Virginia Polytechnic Institute (VPI). **Moldex3D North America is responsible for implementation and commercialization of validated models.**

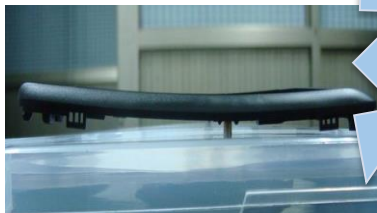
国际专利认证

Moldex3D独家专利

机台选择
成型条件设定



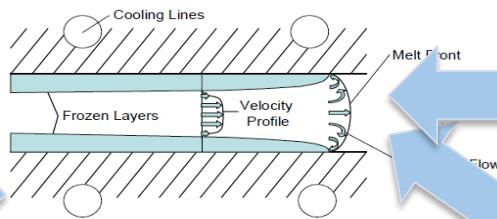
尺寸变形
外观质量



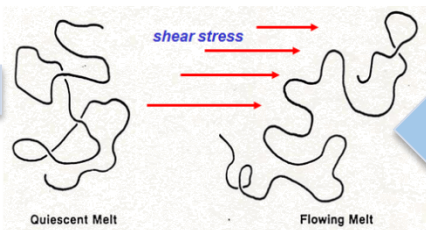
产品性能表现



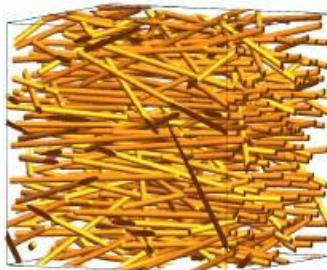
熔胶流动
温度与压力分布



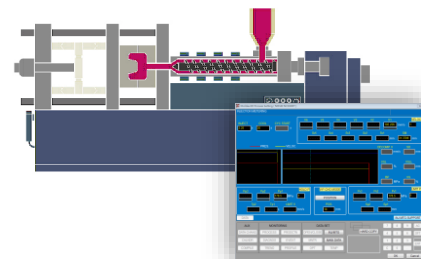
分子结构变化
分子黏弹性的改变



流动导致效应
微结构的改变



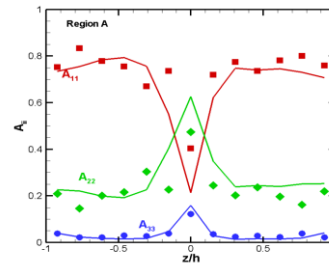
机台界面



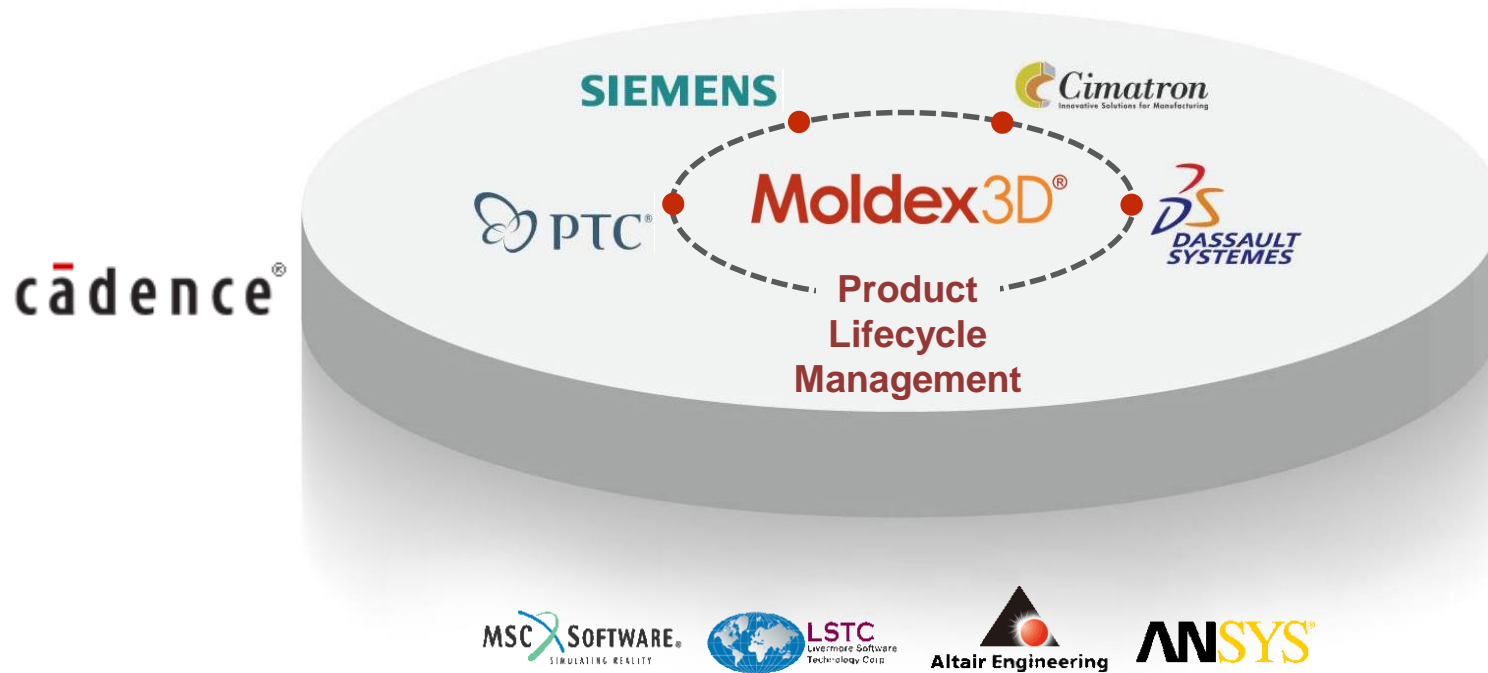
高压黏度量测



纤维配向分析



CAD/CAE/PLM产业生态链



OEM Supplier to Siemens PLM, PTC, Altair and MSC

全球超过3200家企业用户

Automobile	High Tech/Electronics	Material/Equipment

全球模流分析技术的应用现况与最新发展

不只分析模流，模拟完整机台运作，提升准确度

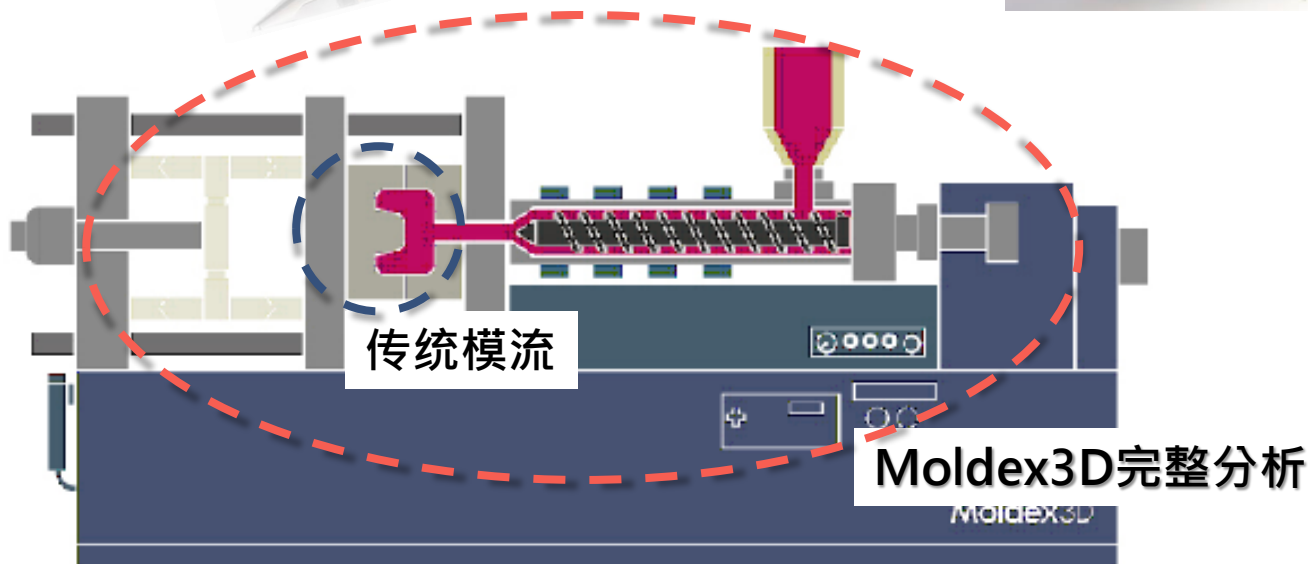
喷嘴



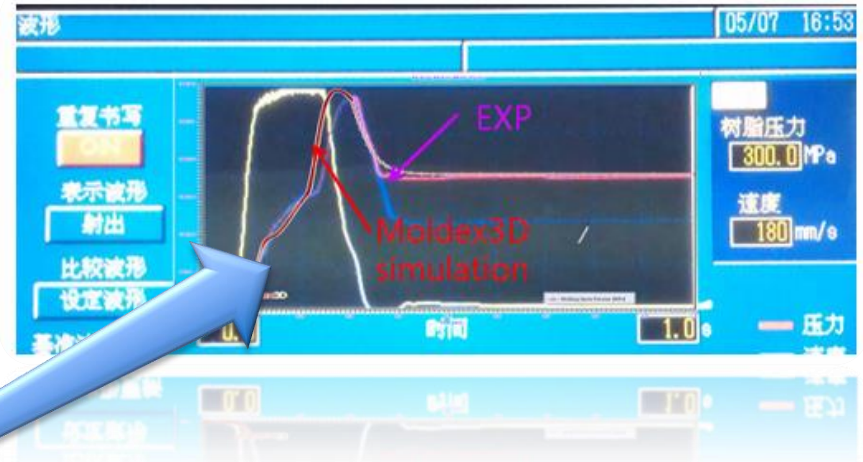
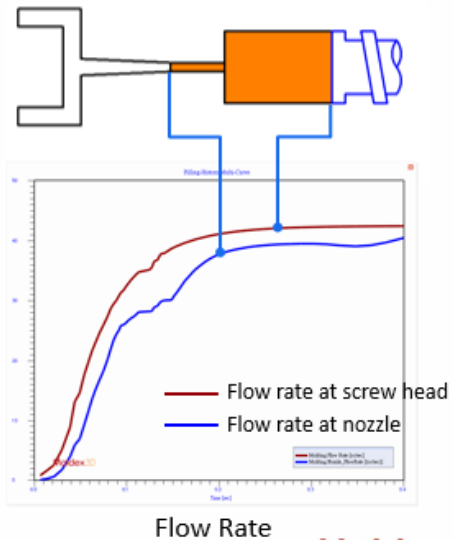
螺杆



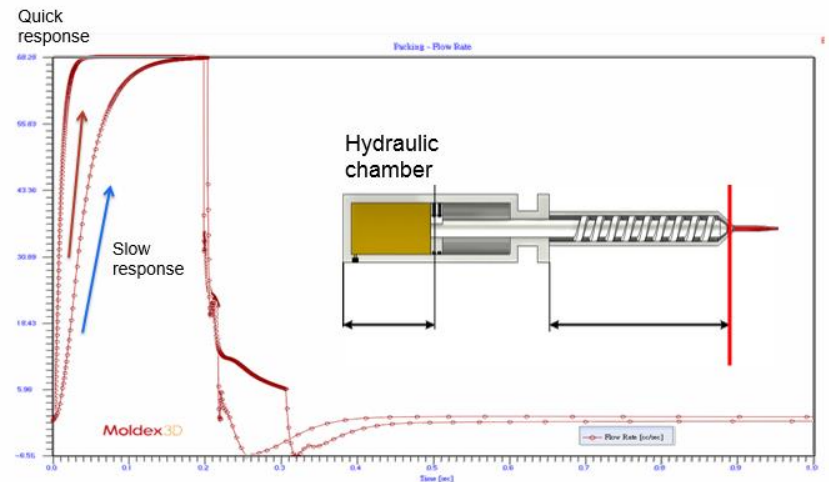
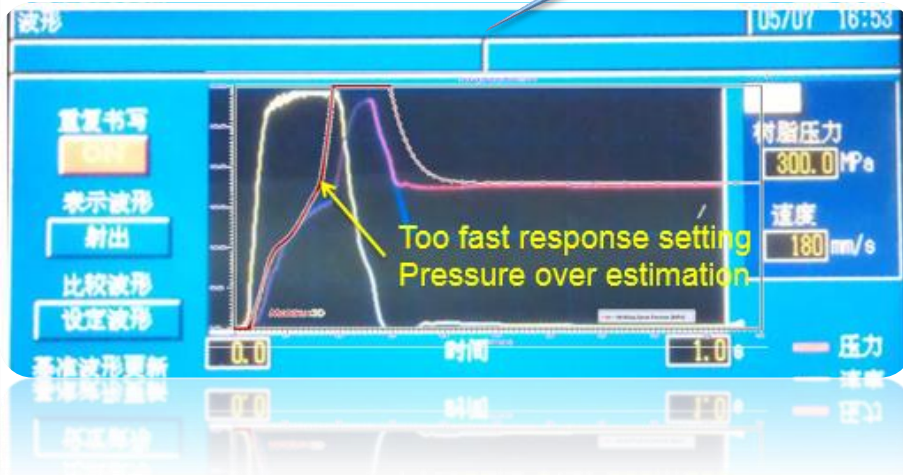
驱动装置



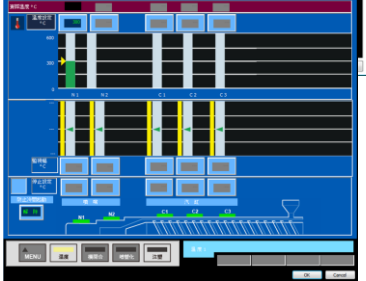
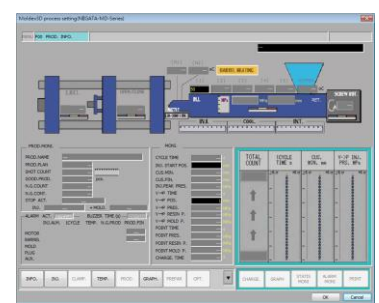
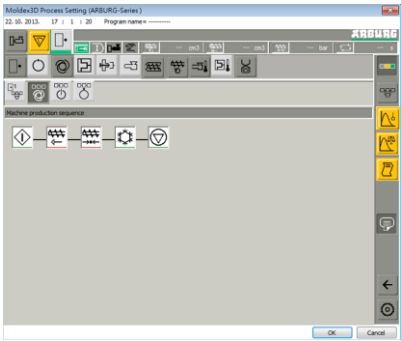
真实计算熔胶可压缩性与注塑机响应



Machine response (time constant)



真实机台接口整合



边界层网格技术

Set BLM Parameters

Geometry Meshing

Attribute: Cavity

Mesh type: 3 Layers BLM

Boundary layer offset ratio: 0.6

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

- Cavity
 - Cavity
 - Part insert
 - Runner
 - Cooling channel
- 3 Layers BLM
 - Pure tetra
 - 1 Layer BLM
 - 2 Layers BLM
 - 3 Layers BLM
 - 4 Layers BLM
 - 5 Layers BLM

Geometry Meshing

Attribute: Part insert

Mesh type: Pure tetra

Geometry Meshing

Attribute: Runner

Mesh type: 5 Layers BLM

Boundary layer offset ratio: 2.0

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

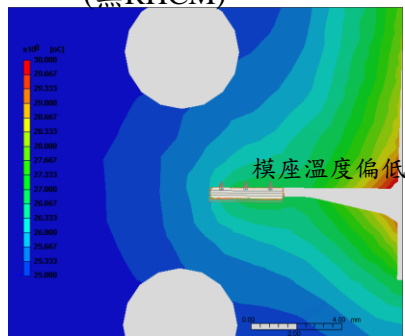
Parameters setting refers to the *.mdg file

1. If new file → last time user used
2. If first use → default setting

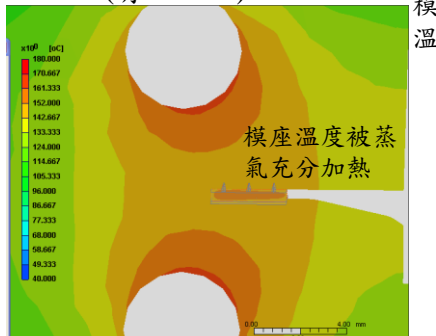
冷却分析

- > 传统分析方式：快速掌握模温分布与公母模模温差
 - 水温，油温，加热棒(温度或功率控制)
- > 瞬时冷却分析：提供更真实的模拟结果，并可延伸模拟可变模温制程。
 - 支持不同类型的冷却条件变化
 - 冷却液(水温，油温，加热棒，蒸气，空气)
 - 温度/时间/流量多段设定
- > 异型水路分析：贴近产品表面，评估更有效率的冷却设计。

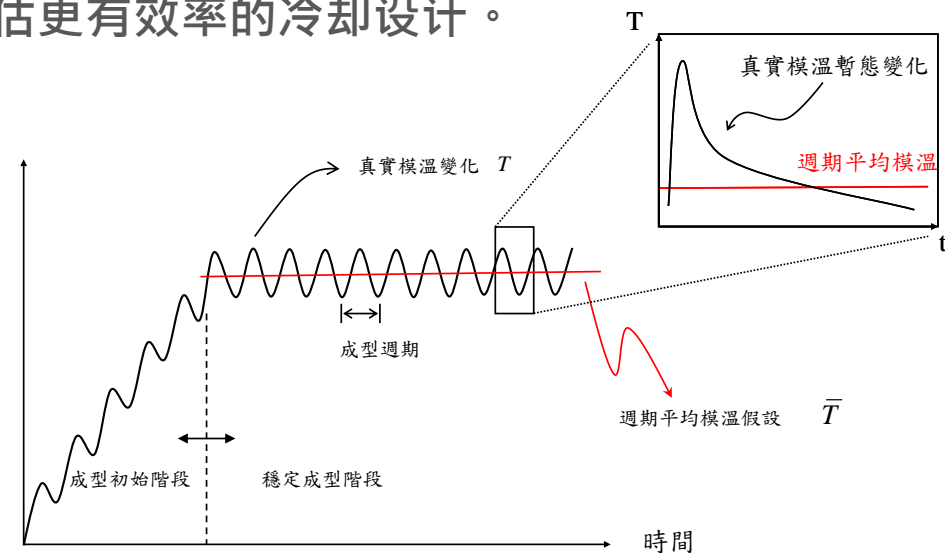
暫態冷卻分析結果
(無RHCM)



暫態冷卻分析結果
(有RHCM)

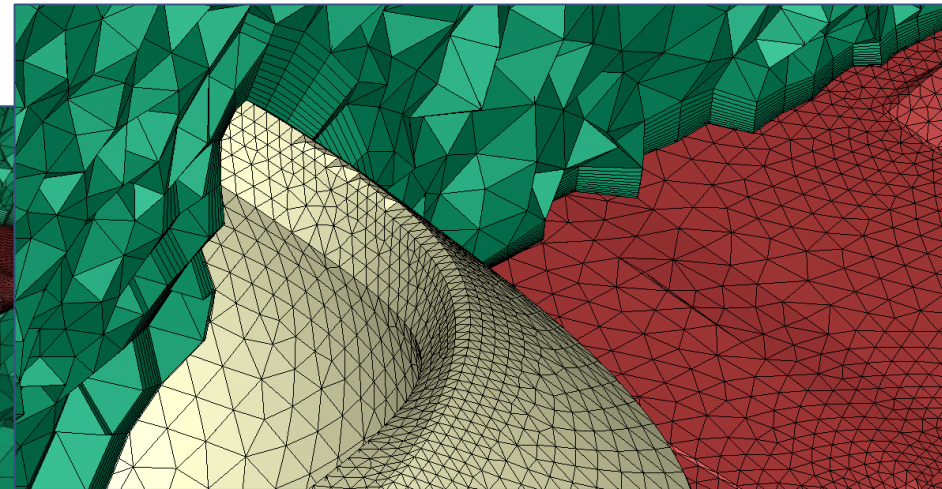
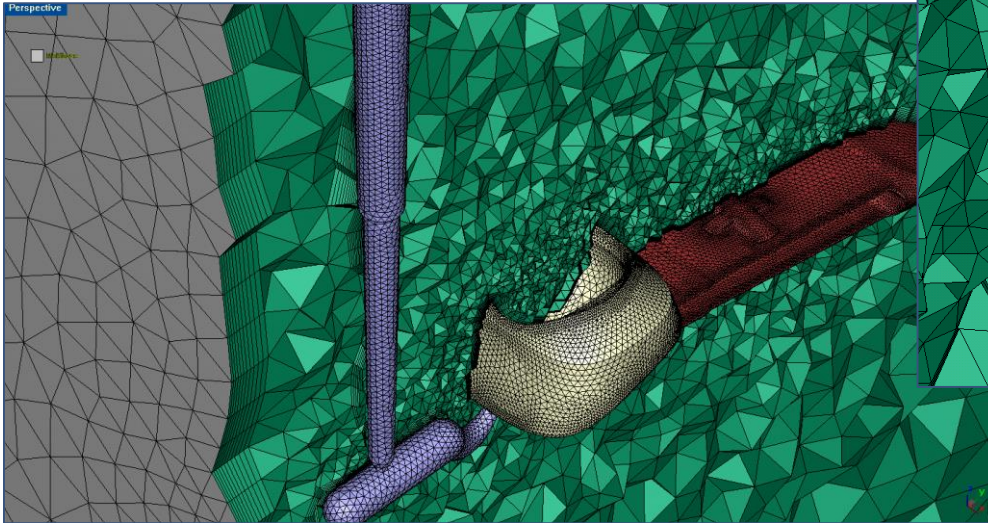


模溫



Non-matching Mesh

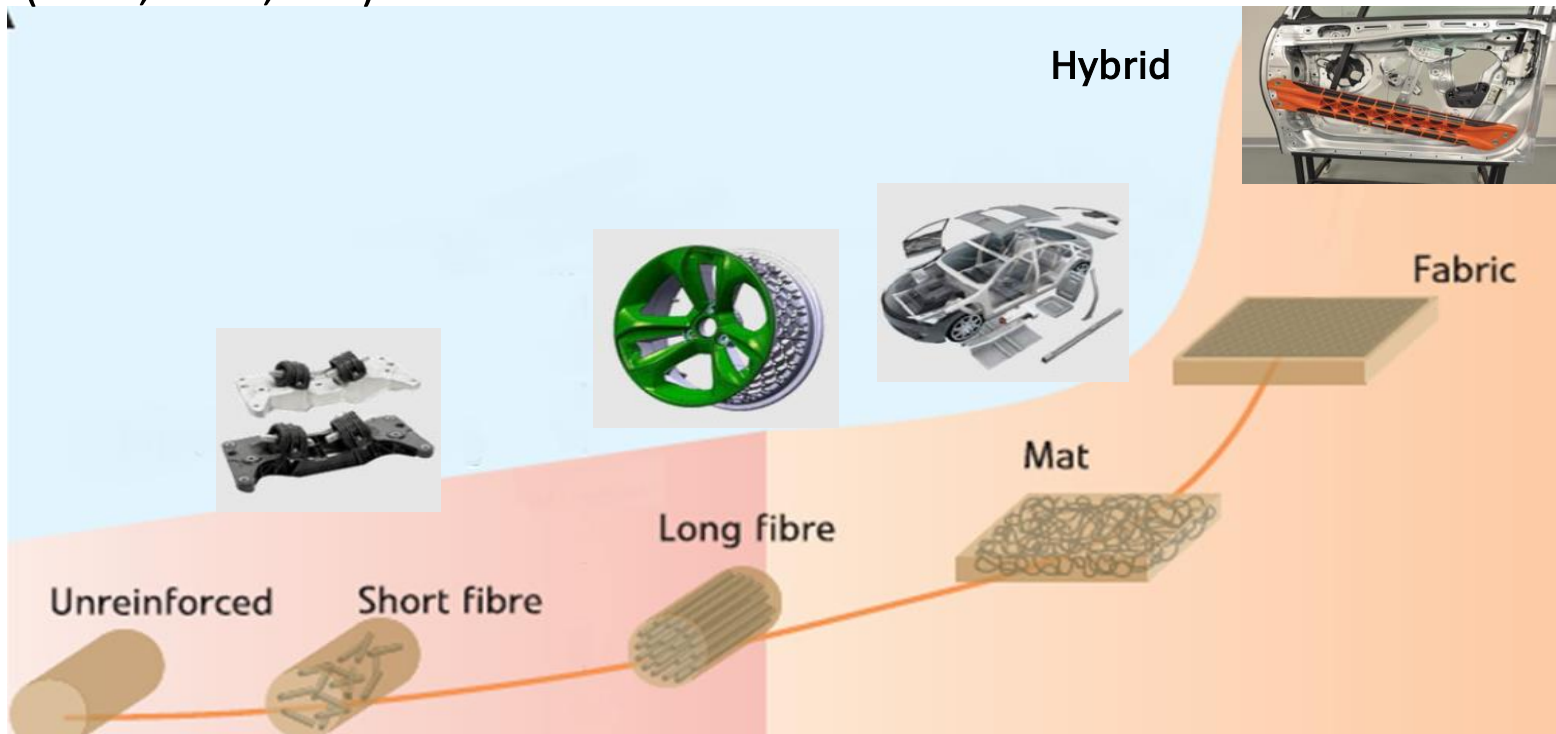
- > Designer BLM with non-matching solid mesh topology
 - Reduce effort in establish mold base mesh
 - Support common used components to be non-matching
 - Part / part insert / mold base



Complete Fiber Reinforced Process Portfolio

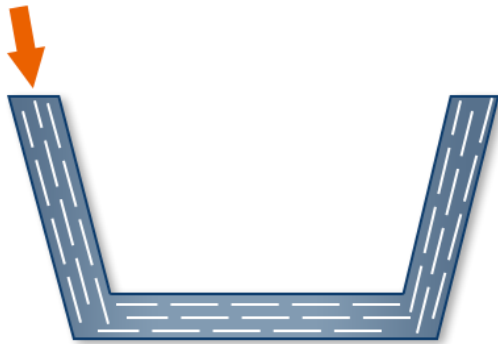
Injection molding
 Compression molding
 (GMT, SMC, LFT)

Resin Transfer Molding
 Multi-component molding

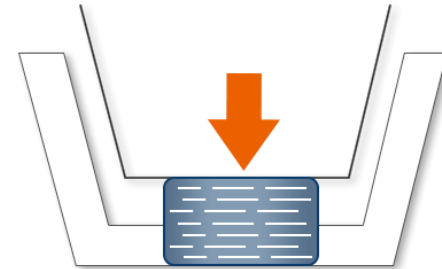


Processes for Composite Material

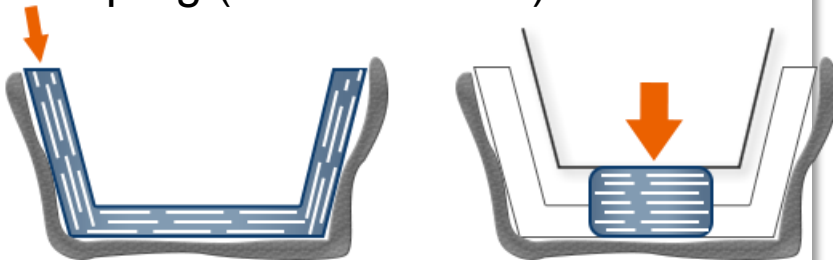
Injection molding (IM),
Chopped Fiber / TP or TS



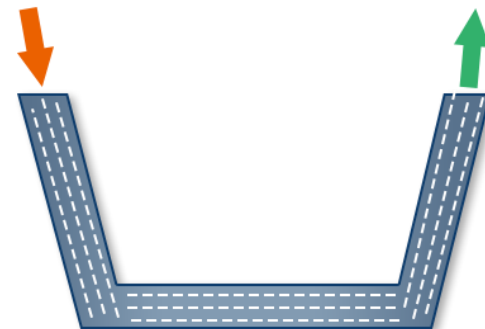
Compression molding (CM),
GMT/DFT, SMC
Chopped Fiber / TP or TS



IM/CM + Over molding,
Chopped Fiber / TP or TS
Prepreg (Wet Fiber mat)

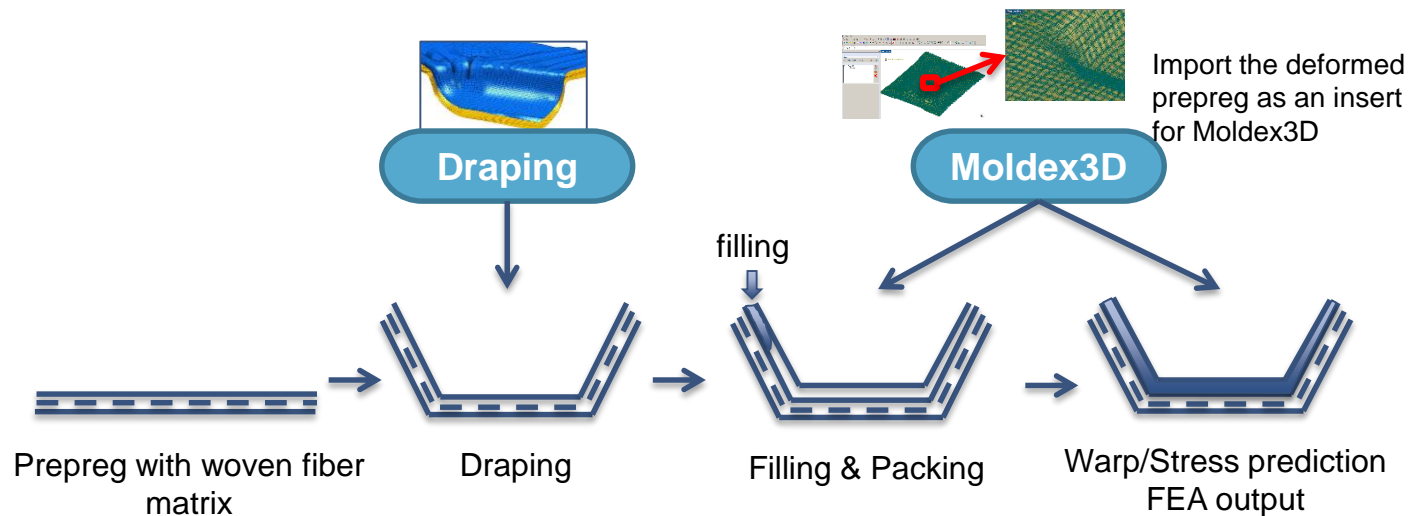
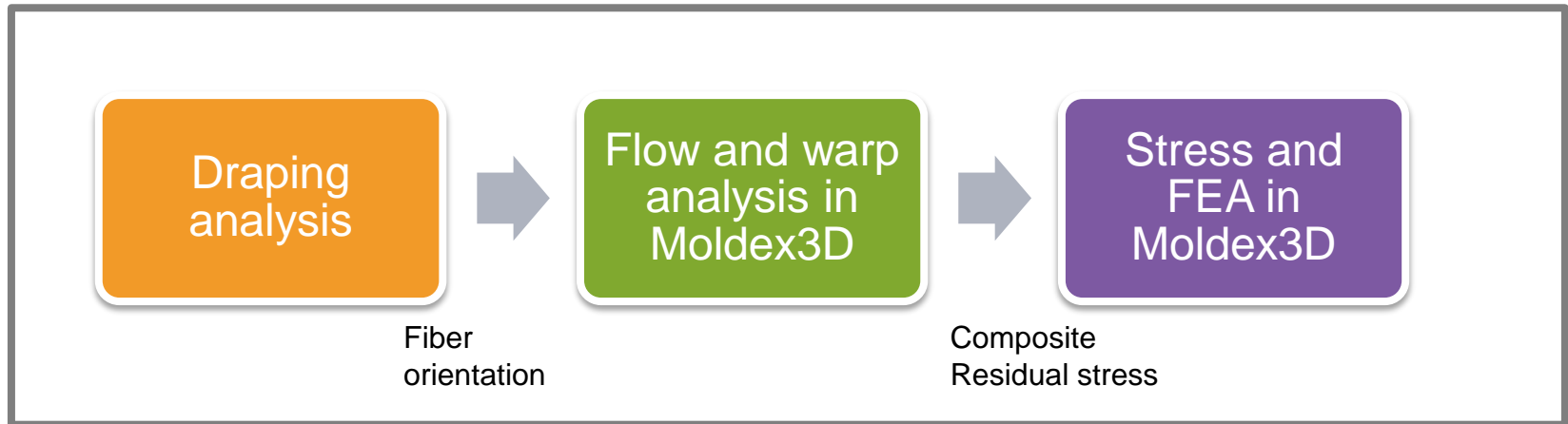


Resin transfer molding (RTM),
Dry Fiber mat / TP or TS



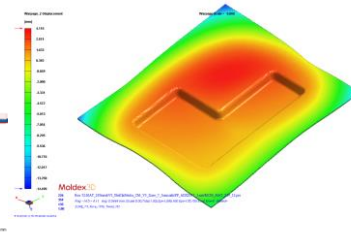
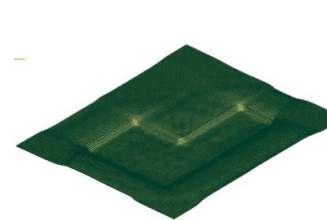
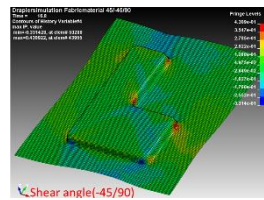
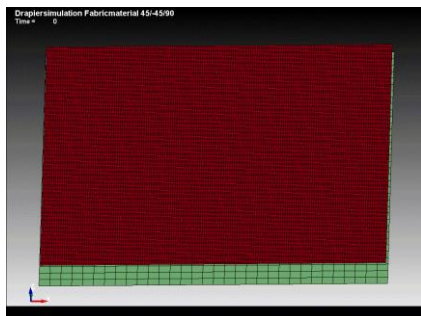
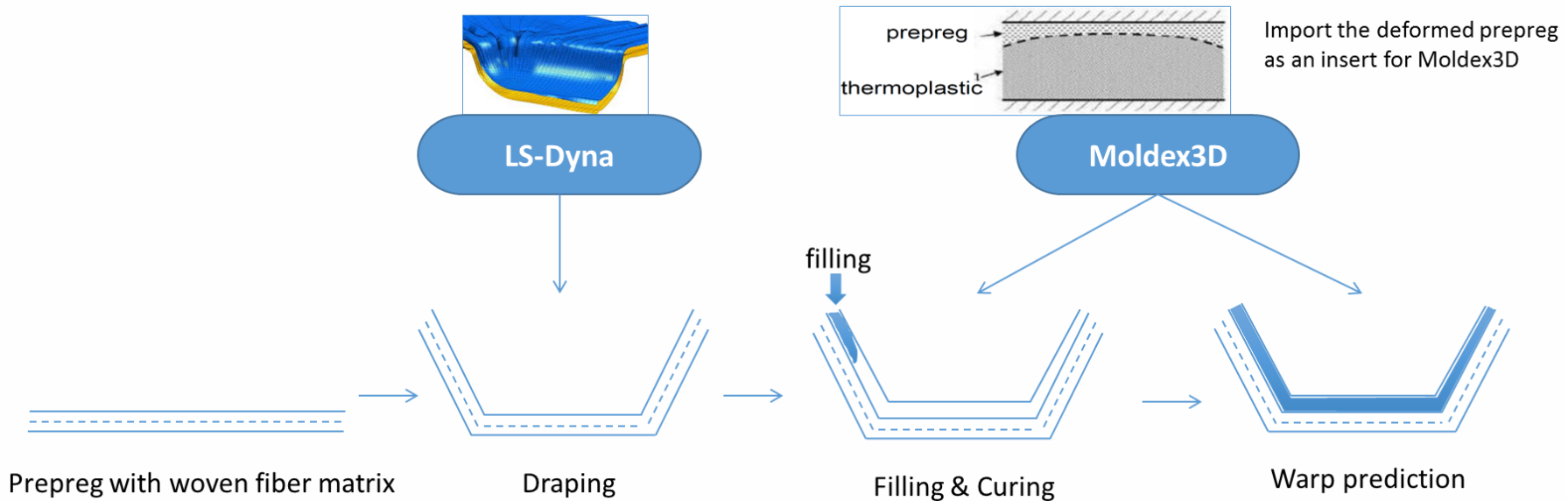
Solver – Over molding, Stress and FEA support the calculation of orthotropic material

> Data exchange between solvers

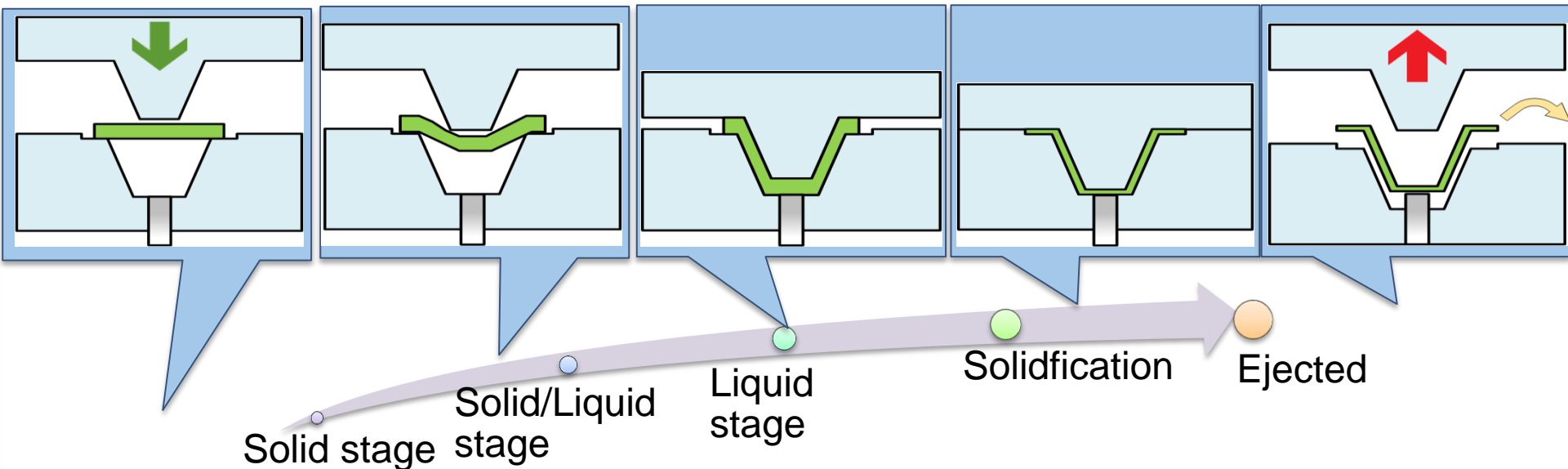


Prepreg Draping Analysis Integration

> Integration of LS-Dyna and Moldex3D



Compression Molding Process



- > **Material will go through different phase change during molding process.**
 - In solid stage, material will have elastic-type property.
 - In liquid stage, material will have plastic-type property.

完整的集成分析整合平台

PROCESS

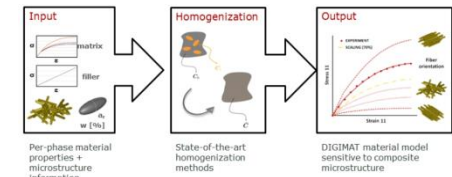
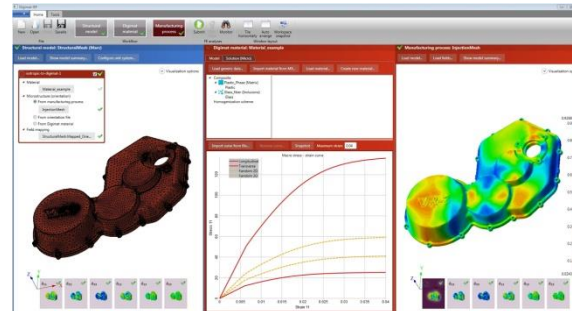
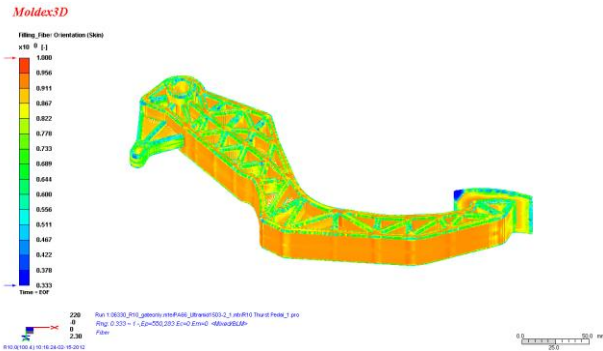


MATERIAL

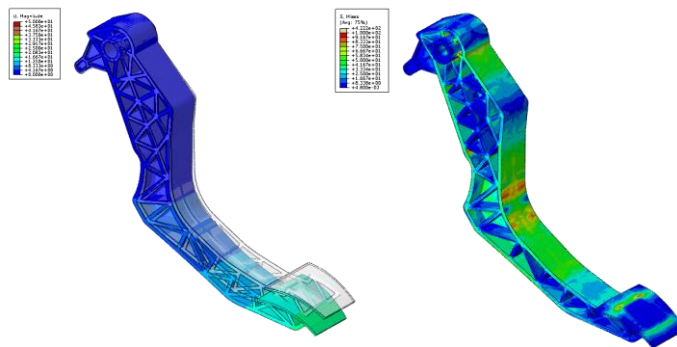
Moldex3D
MOLDING INNOVATION

Moldex3D Digimat-RP

digimat

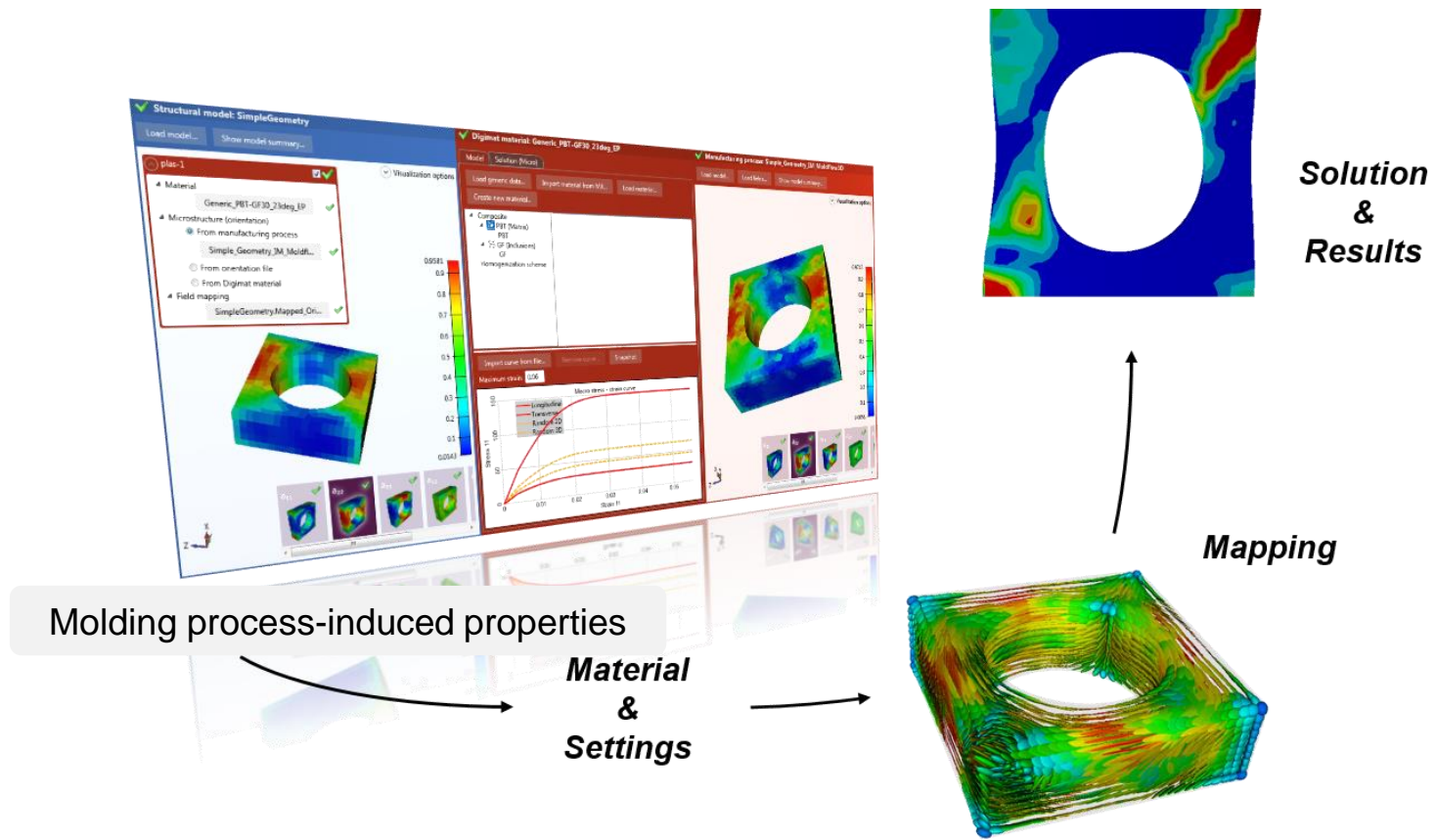


STRUCTURE



Moldex3D Digimat-RP

- 业界最领先的复材微机械性质与FEA集成分析工具
- 25家全球知名材料商的材料库



理念与愿景



成为全球塑料加工解决方案的领导者

- > 不断投注研发能量，提供创新的模流分析技术，以符合产业最新趋势和需求
- > 透过计算机仿真技术体现创新、准确、效率的价值，用专业的技术核心带领客户顺利生产各种塑料产品