

Autodesk Moldflow 2021 What's New 업데이트 내용 소개 및 검증 결과

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2020.12.10



Agenda

- 보안 강화
- Simulation Compute Manager (SCM)
- 솔버 업데이트 및 새로운 기능
- 기타 변경 사항

20년간 Moldflow Synergy 변화

2000



Windows NT (32 bit)
2 CPU motherboard
Single core
256 Mb RAM
80 Gb Hard drive

2020



Windows 10 (64 bit)
16 Cores (or more)
256 Mb X 125 (32 Gb) RAM
1 Tb Solid state drive

기대되는 기술 경향



- 중앙 데이터 :
 - 데이터 공유 및 재사용
 - 어디서나 액세스
 - 새로운 종류의 데이터



- 자동화 및 통찰력 :
 - 워크 플로우 간소화
 - 최적화
 - 인공 지능 및 기계 학습



- 컴퓨팅 파워 :
 - On demand 컴퓨팅 파워
(이용자의 요구에 따라 네트워크를 통해 필요한 정보를 제공하는 방식)
 - 더 저렴하고 다른 하드웨어



보안 강화

데이터 보안 강화

- 소프트웨어가 안전하고 동급 최고의 데이터 보안 모범 사례를 따르도록 함
- Moldflow 제품을 강화하는 데이터 보안에 대한 광범위한 투자 :
 - 자동 코드 스캔
 - 교육 및 인증
 - 확립된 데이터 보안 요구 사항 준수
 - 테스트 자동화
- 이것은 현재와 미래에 귀하의 데이터를 안전하게 보호하기 위한 깊고 지속적인 투자



Our security framework

The Autodesk Security framework was designed around industry standards to ensure consistent security practices, enabling us to build secure, run secure, and stay secure.

Build secure

Embedding security into our products is a critical part of securing our customers' investment in Autodesk products and services.

We build security into our products and services from the ground up. We integrate security activities into all phases of the development

Stay secure

Gaining visibility into our environment offers us valuable insight into persistent suspicious activity, active security incidents, and ongoing exploits impacting Autodesk and our customers.

We take proactive steps to defend against these threats with the

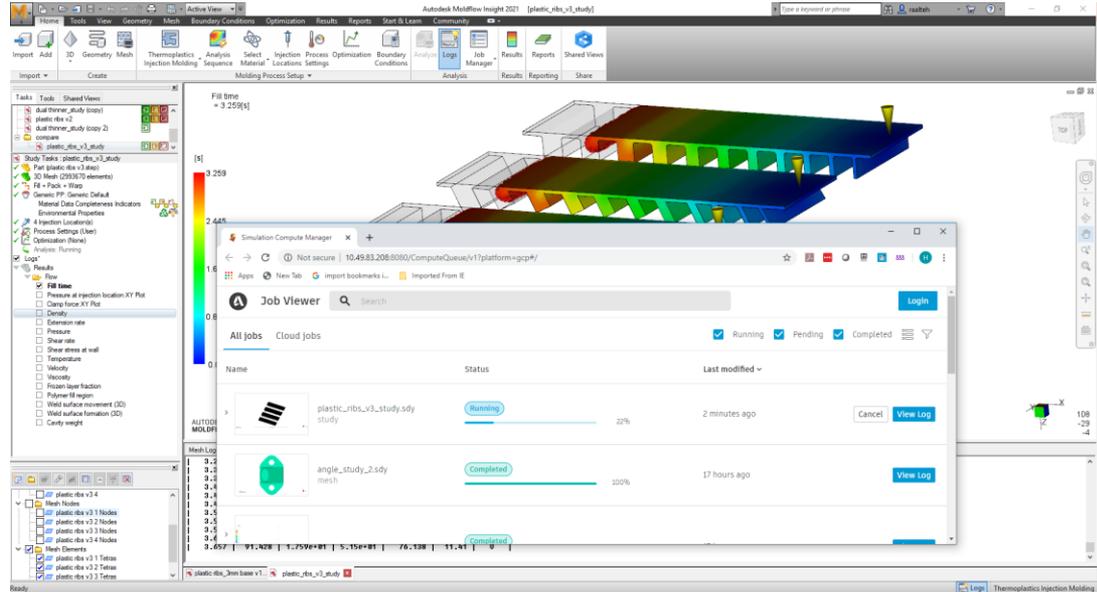


Simulation Compute Manager (SCM)

Simulation Compute Manager (SCM)

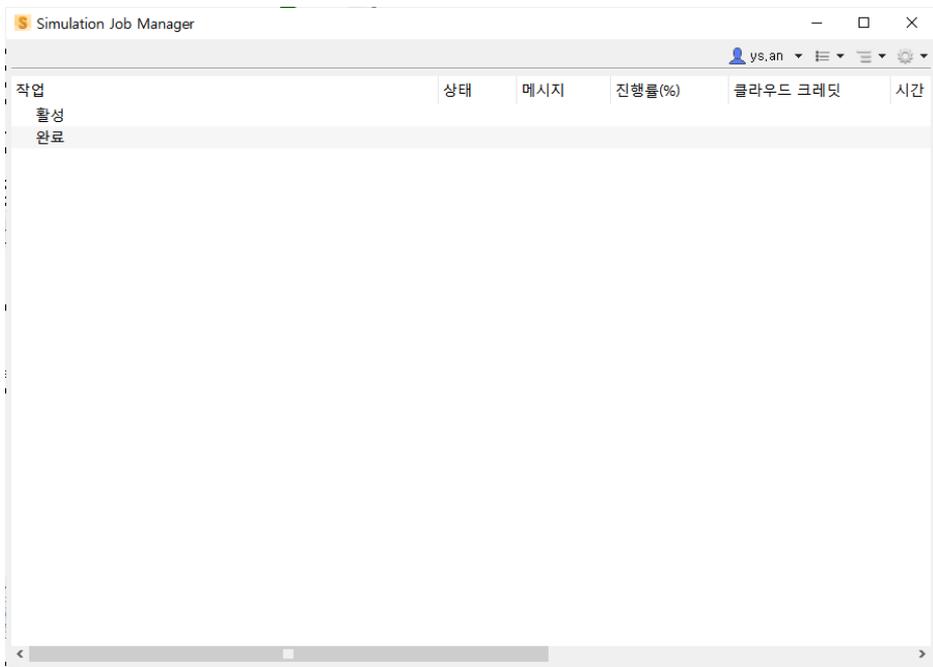
새롭게 개발된 작업 관리자:

- 매우 안전하고 현대적인 아키텍처
- 확장 가능한 최첨단 클라우드 백엔드(Linux 기반)
- 새 배치 대기열 기반 워크플로우

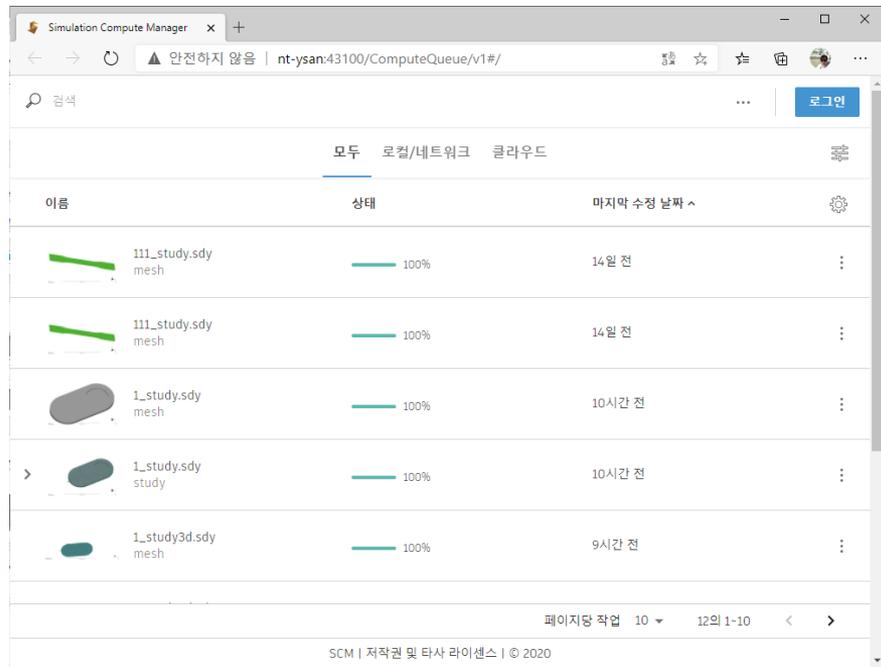


SCM Viewer

- 새롭게 바뀐 Job Manager UI



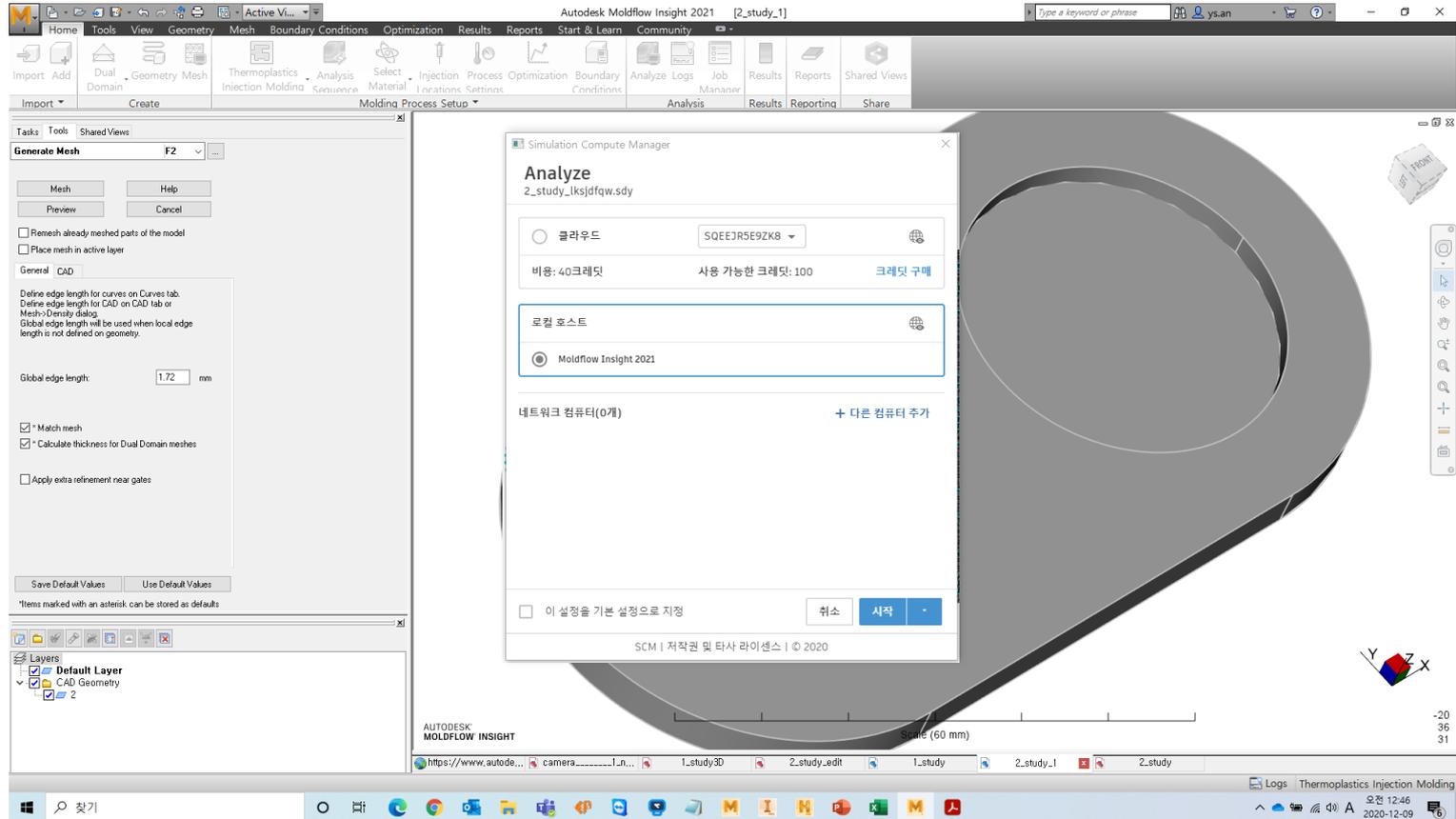
Moldflow 2019



Moldflow 2021

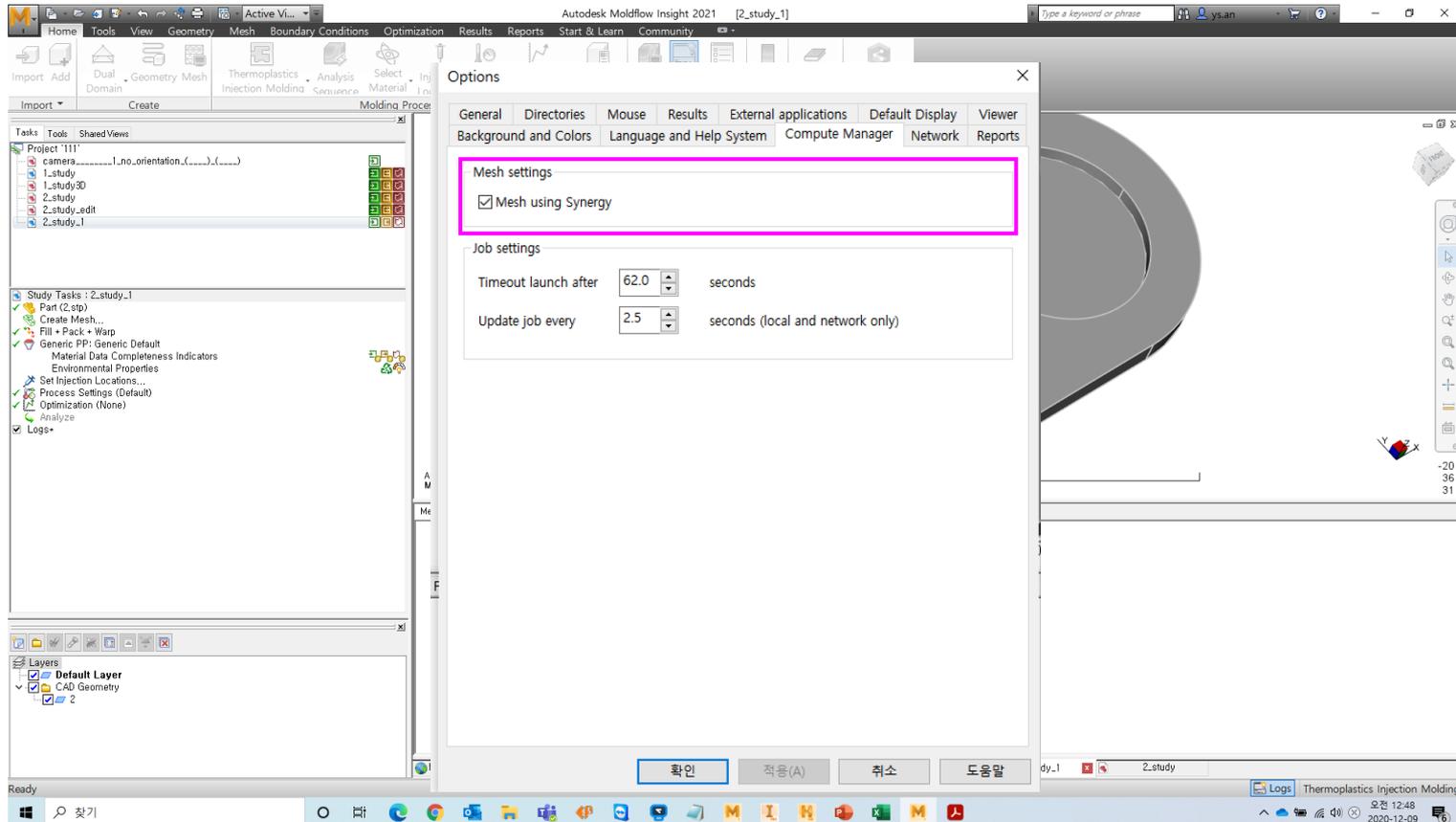
SCM Basic Workflow

- Generate Mesh 사용시 SCM 사용 방법



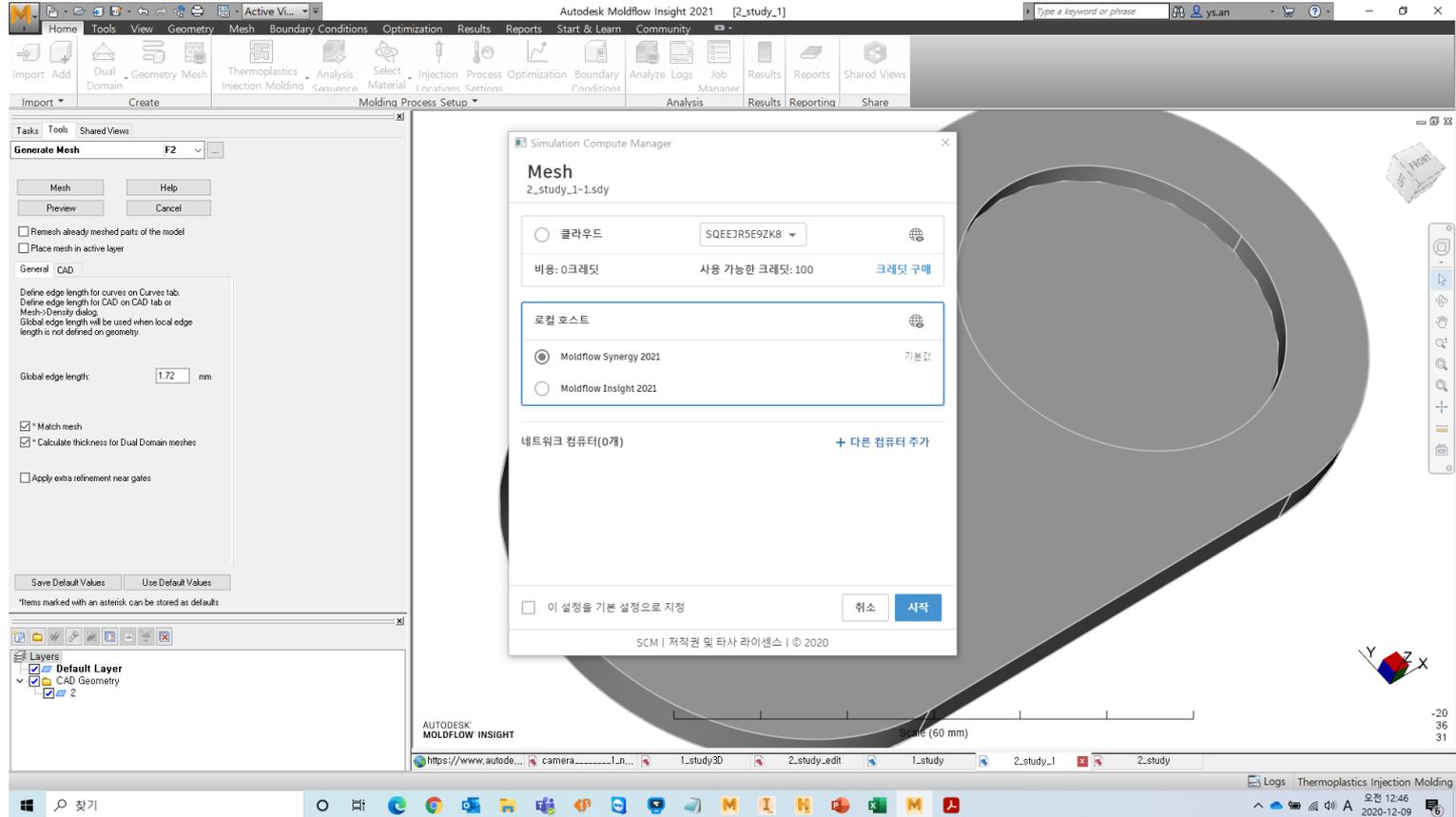
SCM Basic Workflow

- 추가 옵션 적용



SCM Basic Workflow

- 추가 옵션 적용



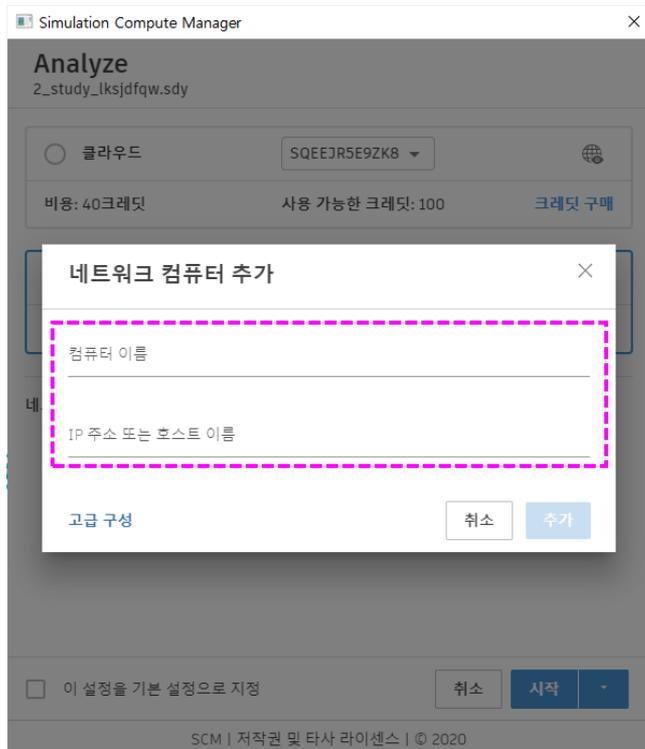
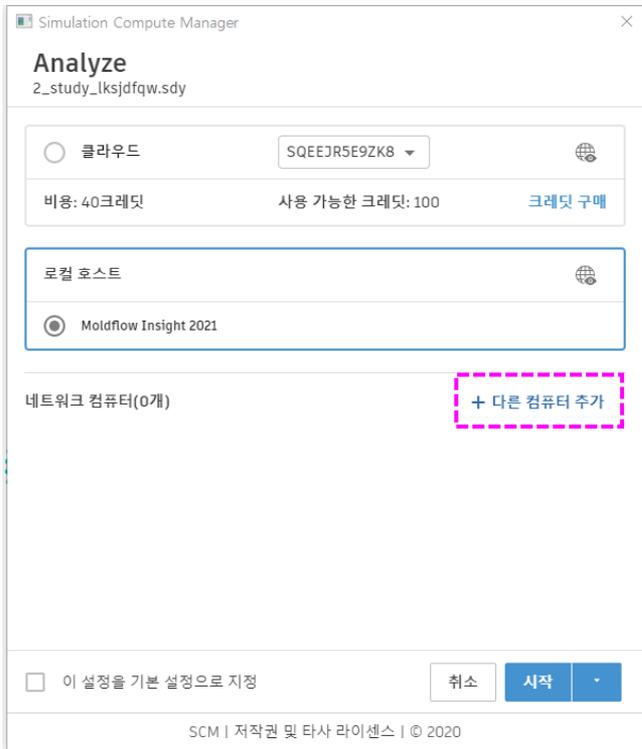
SCM Basic Workflow

- 해석 시작 관련 명칭 변경

The screenshot displays the Autodesk Moldflow Insight 2021 software interface. The main window shows a 3D model of a curved part with a mesh. Two panels on the left, 'Study Tasks : 2_study' and 'Study Tasks : 2_study_1', are highlighted with a dashed pink border. A pink arrow points from the 'Study Tasks : 2_study_1' panel to the 'Study Tasks : 2_study' panel. The 'Study Tasks : 2_study' panel lists tasks with green checkmarks: Part (2,stp), Create Mesh..., Fill, Generic PP: Generic Default, Material Quality Indicators, Environmental Properties, Set Injection Locations..., Process Settings (Default), Optimization (None), and Start Analysis!. The 'Study Tasks : 2_study_1' panel lists similar tasks with green checkmarks: Part (2,stp), Dual Domain Mesh (14648 elements), Fill + Pack + Warp, Generic PP: Generic Default, Material Data Completeness Indicators, Environmental Properties, Set Injection Locations..., Process Settings (Default), Optimization (None), Analyze, and Logs+. Below the task lists are two colored buttons: a blue button labeled '2019' and an orange button labeled '2021'. The bottom status bar shows the execution time and completion date for the meshing process.

SCM Basic Workflow

- 네트워크 컴퓨터 추가 방법



SCM Viewer

The screenshot displays the Autodesk Moldflow Insight 2021 software interface. The main window shows a 3D model of a shoe sole, rendered as a dense mesh of blue and green triangles. The interface includes a top menu bar with options like Home, Tools, View, Geometry, Mesh, Boundary Conditions, Optimization, Results, Reports, Start & Learn, and Community. Below the menu is a toolbar with icons for various functions. On the left side, there are two panels: 'Tasks' and 'Layers'. The 'Tasks' panel shows a project tree with items like 'Project 1111', 'camera', '1_study', '1_study3D', '2_study', '2_study_edit', '2_study_1', and '2_study_lksjdfqw'. The 'Layers' panel shows a hierarchy of layers including 'Default Layer', 'CAD Geometry', '2', 'Mesh Nodes', '2 Nodes', 'Mesh Elements', and '2 Tetras'. At the bottom of the main window, there is a scale bar labeled 'Scale (60 mm)' and a coordinate system with X, Y, and Z axes. The status bar at the very bottom shows the text 'Ready' and 'Autodesk Moldflow Insight'.

SCM Viewer

- 새롭게 바뀐 Job Manager UI

The screenshot displays the Simulation Compute Manager interface. The browser address bar shows the URL: `nt-ysan:43100/ComputeQueue/v1?platform=gcp#/`. The page title is "작업 뷰어" (Job Viewer). The main content area shows a table of simulation jobs with columns for "이름" (Name), "상태" (Status), and "마지막 수정 날짜" (Last Modified Date). The jobs listed are:

이름	상태	마지막 수정 날짜
2_study_lksjdfqw.study	실행 중 (10%)	몇 초 전
2_study_1~1.sdy mesh	완료됨 (100%)	한 시간 전
2_study_edit.sdy study	완료됨 (100%)	2시간 전
2_study_edit.sdy study	완료됨 (100%)	2시간 전
2_study.sdy study	완료됨 (100%)	2시간 전

At the bottom of the page, there is a footer: "Autodesk Simulation Compute Manager | 저작권 및 타사 라이선스 | © 2020 Autodesk Inc. All rights reserved".

SCM Viewer

- SCM 에서 로그 확인 가능

The screenshot shows the Simulation Compute Manager interface. The browser address bar displays the URL: `nt-ysan:43100/ComputeQueue/v1?platform=gcp#`. The page title is "작업 뷰어" (Job Viewer). The interface includes a search bar, a "로그인" (Login) button, and a "구성" (Configure) button. The main content area displays a table of simulation jobs with columns for "이름" (Name), "상태" (Status), and "마지막 수정 날짜" (Last Modified Date). The jobs are categorized by "모두" (All), "로컬/네트워크" (Local/Network), and "클라우드" (Cloud). The "로그 보기" button is highlighted with a red dashed box.

이름	상태	마지막 수정 날짜
2_study_lksjdfqw.sdy study	실행 중 (18%)	몇 초 전
study:mhb3d:00	37%	
study:warp3d:01		
2_study_1~1.sdy mesh	완료됨 (100%)	한 시간 전
2_study_edit.sdy study	완료됨 (100%)	2시간 전
2_study_edit.sdy study	완료됨 (100%)	2시간 전

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SCM Viewer

- SCM 에서 로그 확인 가능

The screenshot shows the Simulation Compute Manager web interface. A modal window titled '로그' (Log) is open, displaying the output for a study named '1_study.sdy'. The log includes a table of displacements, analysis time, and a success message.

로그
1_study.sdy

Study:flow:00 Study:warp:01

4 0 0 0 23825 1 0 1.0e+00 1.000e+00 1.585e-08

Minimum/maximum displacements at last step (unit: mm):

	Node	Min.	Node	Max.
Trans-X	3025	-4.5344e-07	33516	4.9318e-07
Trans-Y	3781	-4.8134e-07	32968	4.3197e-07
Trans-Z	295	-5.9262e-07	26230	3.9011e-07

Elapsed wall clock time in structural analysis: 17.36 secs.

Writing result file...

Best-fit transformation will be used to display warpage deflections if no anchor plane is defined.

Execution time
 Analysis commenced at Tue Dec 8 15:39:48 2020
 Analysis completed at Tue Dec 8 15:40:09 2020
 CPU time used 17.39 s

Warp analysis has completed successfully.

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SCM Viewer

• SCM 에서 필터링 기능

The screenshot shows the main interface of the Simulation Compute Manager. At the top, there is a search bar and a '로그인' (Login) button. Below this, there are tabs for '모두' (All), '로컬/네트워크' (Local/Network), and '클라우드' (Cloud). A '필터' (Filter) button is highlighted with a pink dashed box. The main area contains a table of simulation jobs with columns for '이름' (Name), '상태' (Status), and '마지막 수정 날짜' (Last Modified Date). The table lists several jobs, including '111_study.sdy mesh' and '1_study.sdy mesh', all with a status of '100%' and completion times ranging from 9 hours to 14 days ago. At the bottom, there is a pagination bar showing '페이지당 작업 10' and '12의 1-10', and a footer with 'SCM | 저작권 및 타사 라이선스 | © 2020'.

이름	상태	마지막 수정 날짜
111_study.sdy mesh	100%	14일 전
111_study.sdy mesh	100%	14일 전
1_study.sdy mesh	100%	10시간 전
1_study.sdy study	100%	10시간 전
1_study3d.sdy mesh	100%	9시간 전

This block contains two screenshots. The top screenshot shows a detailed view of the simulation jobs, with a '필터' (Filter) menu open on the right. The menu includes options for '실행 중' (Running), '보류 중' (On Hold), '종료됨' (Completed), '종류별' (By Type), and '필터' (Filter). The '실행 중' and '종료됨' options are checked. The table below shows two jobs, both with a status of '100%'. The bottom screenshot shows the '필터' (Filter) dialog box, which has dropdown menus for '사용자' (User), '제품' (Product), and '시간 범위' (Time Range), all currently set to '모두' (All). A pink arrow points from the '필터' button in the top screenshot to the '필터' dialog box in the bottom screenshot.

이름	상태
111_study.sdy mesh	100%
111_study.sdy mesh	100%

SCM Viewer

- 해석 진행 설정 방법

The screenshot shows the Simulation Compute Manager web interface. The browser address bar displays the URL: `nt-ysan:43100/ComputeQueue/v1?platform=gcp#`. The page header includes a search bar and a '구성' (Configure) button highlighted with a red dashed box. The main content area displays a table of simulation studies with columns for Name, Status, and Last Update Time.

이름	상태	마지막 수정 날짜
2_study_lksjdfqw.study	실행 중 (21%)	몇 초 전
study:mhb3d:00	43%	
study:warp3d:01		
2_study_1~1.sdy.mesh	완료됨 (100%)	한 시간 전
2_study_edit.sdy.study	완료됨 (100%)	2시간 전
2_study_edit.sdy.study	완료됨 (100%)	2시간 전

Page footer: Autodesk Simulation Compute Manager | 저작권 및 타사 라이선스 | © 2020 Autodesk Inc. All rights reserved

SCM Viewer

- 해석 진행 설정 방법

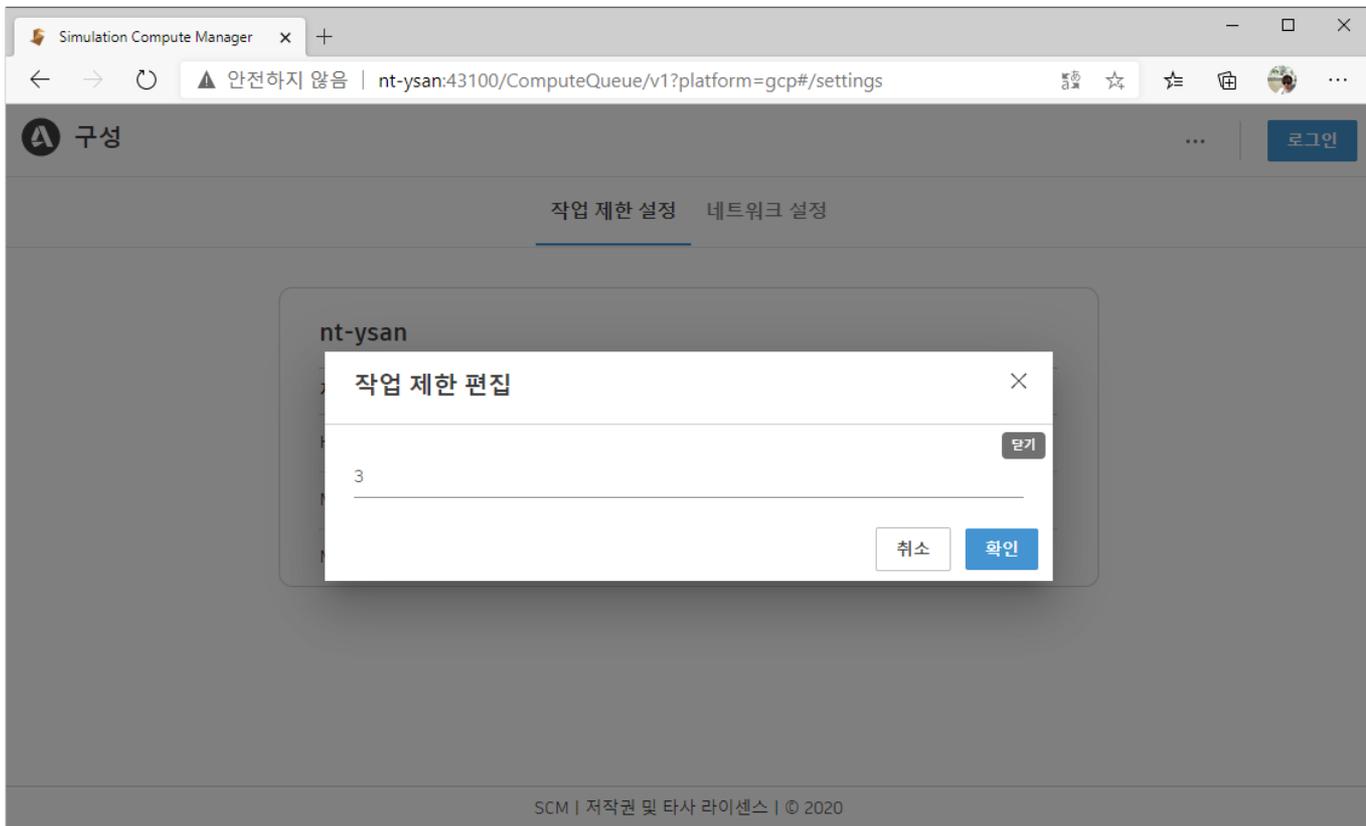
The screenshot shows a web browser window with the address bar displaying 'Simulation Compute Manager' and the URL 'nt-ysan:43100/ComputeQueue/v1?platform=gcp#/settings'. The page title is '구성' (Configuration). There are two tabs: '작업 제한 설정' (Job Limit Settings) and '네트워크 설정' (Network Settings). The '작업 제한 설정' tab is active and displays a table for the 'nt-ysan' environment.

제품	작업 제한	상태
Hello (prd)	8	실행 중인 작업: 0 ...
Moldflow Synergy 2...	3	실행 중인 작업: 0 ...
Moldflow Insight 2021	3	실행 중인 작업: 1 ...

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SCM Viewer

- 해석 진행 설정 방법



The screenshot shows a web browser window titled "Simulation Compute Manager" with the URL "nt-ysan:43100/ComputeQueue/v1?platform=gcp#/settings". The page has a header with a logo and the text "구성" (Configuration) and a "로그인" (Login) button. Below the header, there are two tabs: "작업 제한 설정" (Job Limit Settings) and "네트워크 설정" (Network Settings). The "작업 제한 설정" tab is active, and a modal dialog titled "작업 제한 편집" (Job Limit Edit) is displayed. The dialog has a close button (X) in the top right corner. Inside the dialog, there is a text input field containing the number "3" and a "닫기" (Close) button to its right. At the bottom of the dialog, there are two buttons: "취소" (Cancel) and "확인" (Confirm).

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SCM Viewer

- 추가 해석 PC 설정 방법

The screenshot shows a web browser window with the address bar displaying "Simulation Compute Manager" and the URL "nt-ysan:43100/ComputeQueue/v1?platform=gcp#/settings". The page title is "구성" (Configuration) and there is a "로그인" (Login) button. The main content area is titled "작업 제한 설정" (Job Limit Settings) and "네트워크 설정" (Network Settings). The section "nt-ysan을(를) 서버 컴퓨터에 연결" (Connect nt-ysan to server computer) includes a list of instructions: "배포 네트워크에 컴퓨터 추가" (Add computer to Bepo network) and "다른 서버에서 작업 가져오기" (Fetch jobs from other servers). Below this is a table with one row labeled "서버" (Server) and a "+ 서버에 연결" (+ Connect to server) button. To the right is a diagram showing a network of servers and monitors, with one server labeled "nt-ysan" and a checkmark icon indicating a successful connection.

Simulation Compute Manager x +

← → ↻ ▲ 안전하지 않음 | nt-ysan:43100/ComputeQueue/v1?platform=gcp#/settings

구성 ... 로그인

작업 제한 설정 네트워크 설정

nt-ysan을(를) 서버 컴퓨터에 연결

- 배포 네트워크에 컴퓨터 추가
- 다른 서버에서 작업 가져오기

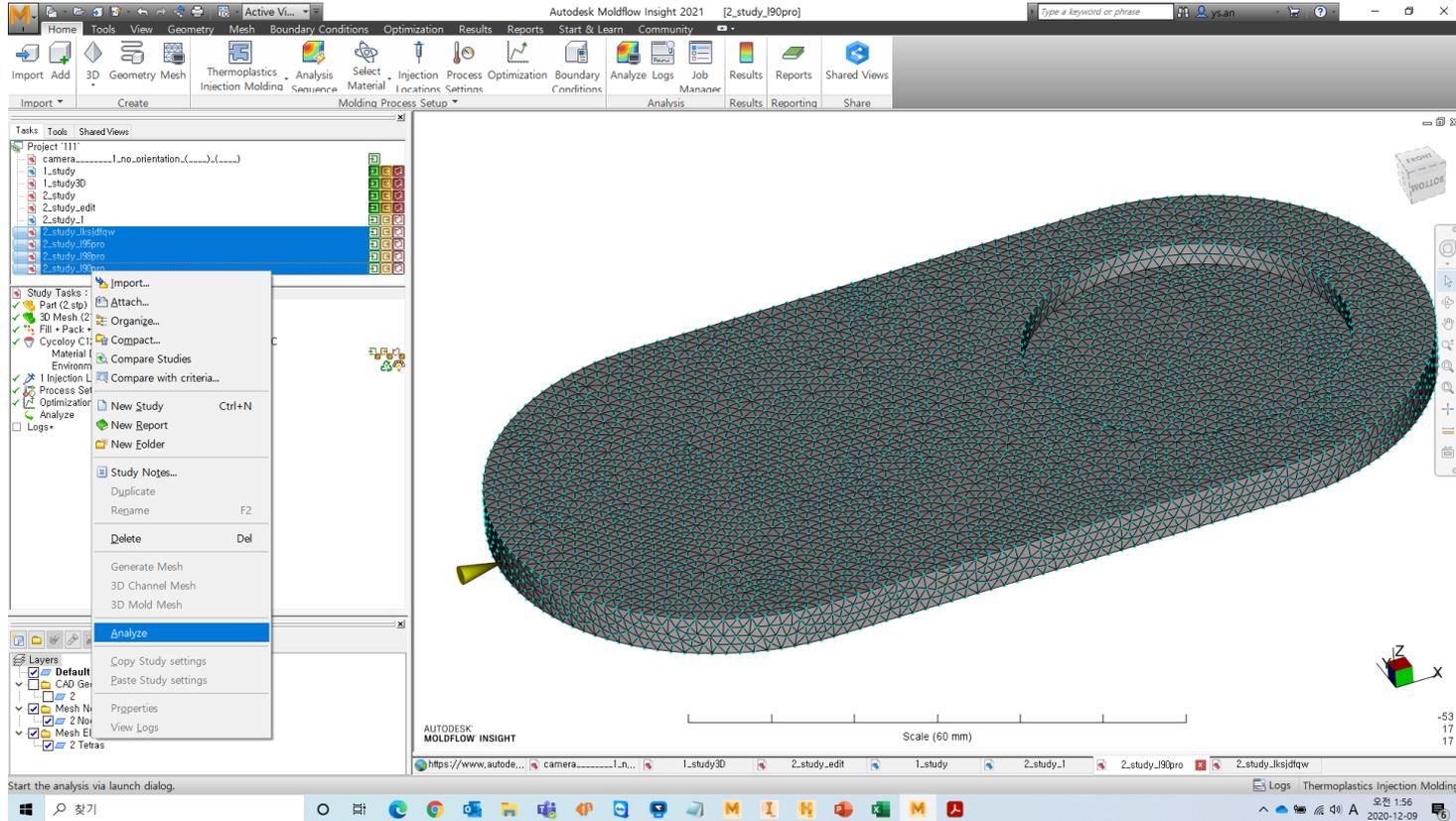
서버	+ 서버에 연결

nt-ysan

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최대 동시 해결 및 여러 작업 제출

- 한번에 여러 Study를 동시에 작업 제출 가능



최대 동시 해결 및 여러 작업 제출

- 한번에 여러 Study를 동시에 작업 제출 가능

Simulation Compute Manager x +

← → ↻ ⚠ 안전하지 않음 | nt-ysan:43100/ComputeQueue/v1?platform=gcp#/

검색 ... 로그인

모두 로컬/네트워크 클라우드

이름	상태	마지막 수정 날짜	
> 2_study_l95pro.sdy study	1%	몇 초 전	⋮
> 2_study_lksjdfqw.sdy study	1%	몇 초 전	⋮
> 2_study_l90pro.sdy study	0%	몇 초 전	⋮
2_study_l98pro.sdy study		몇 초 전	⋮
> 2_study_lksjdfqw.sdy study	100%	6분 전	⋮

페이지당 작업 10 17의 1-10 < >

SCM | 저작권 및 타사 라이선스 | © 2020

- 제한된 작업 수만큼 해석이 진행되고 다른 Study파일은 대기 후 해석 진행

솔버 업데이트 및 새로운 기능

The background features a series of light blue, semi-transparent, overlapping geometric shapes that resemble a stylized landscape or architectural elements. A prominent white diagonal line runs from the top right towards the bottom left, bisecting the scene. The overall aesthetic is clean, modern, and professional.

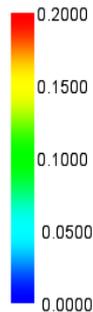
향상된 싱크 표시

■ 향상된 싱크 표시 예측:

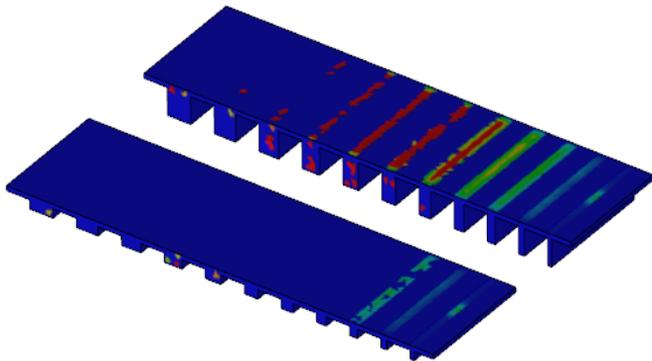
- 싱크 마크 예측 개선
- 두께 변화가 있는 모든 영역에서 싱크 마크를 식별 가능
- 크기 및 위치 예측 측면에 개선되었으며, Rib 위치 뿐만 아니라 두께 변화가 있는 모든 위치에서 싱크 마크 예측 가능

Sink marks estimate
Scale Factor = 1.000

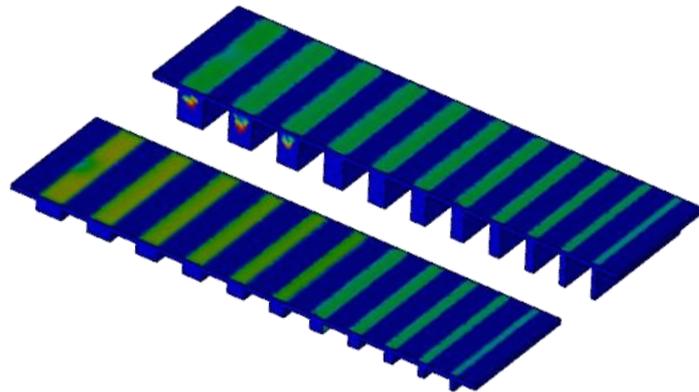
[mm]



2019



2021

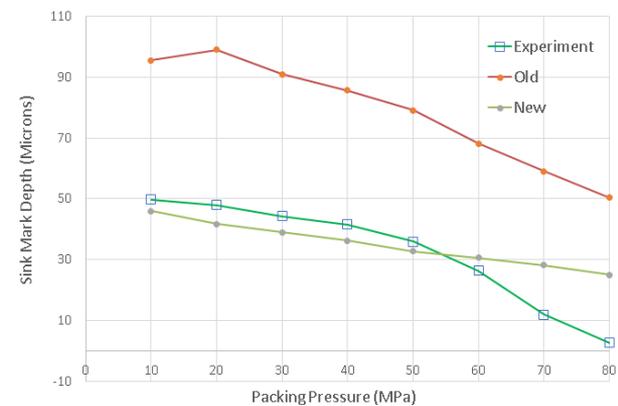
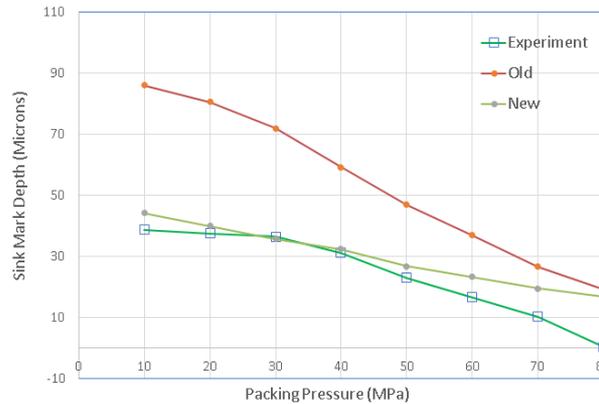
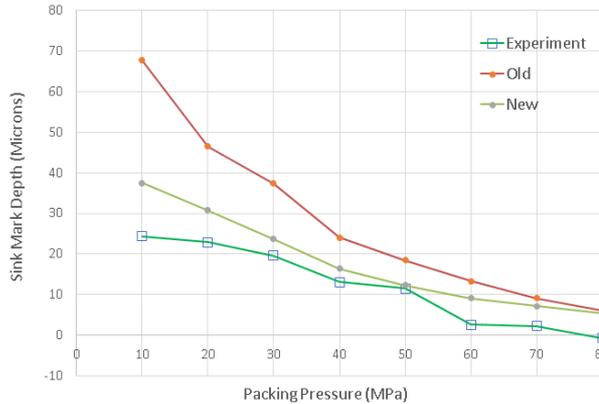
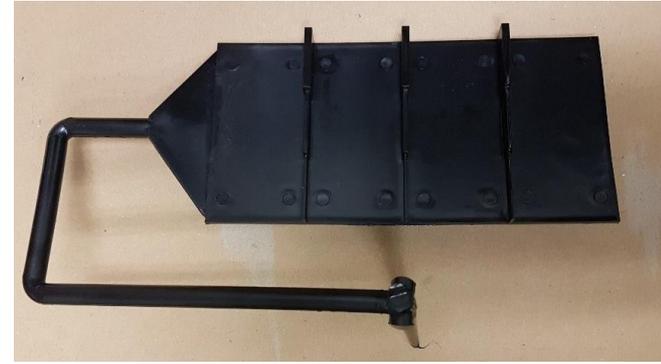
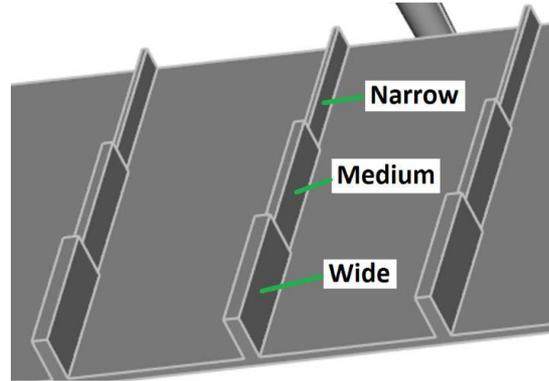


향상된 싱크 표시

■ Example :

- ABS 재료를 이용

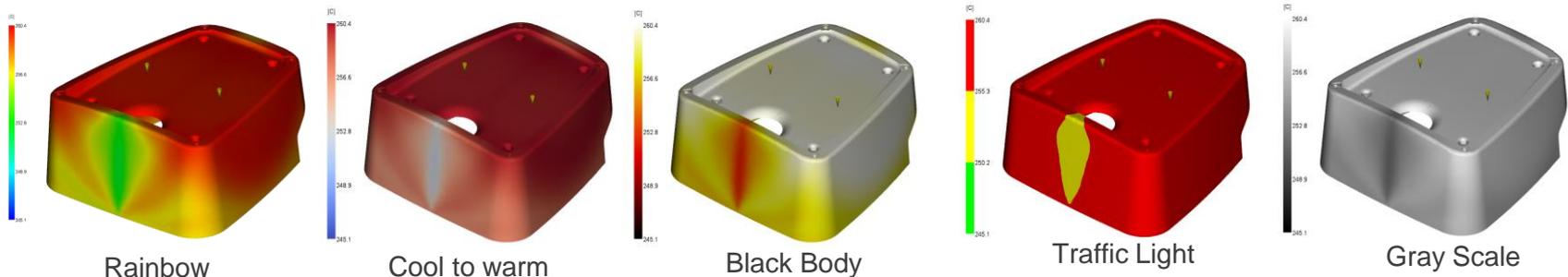
싱크마크 Test 진행



새 시각화 옵션

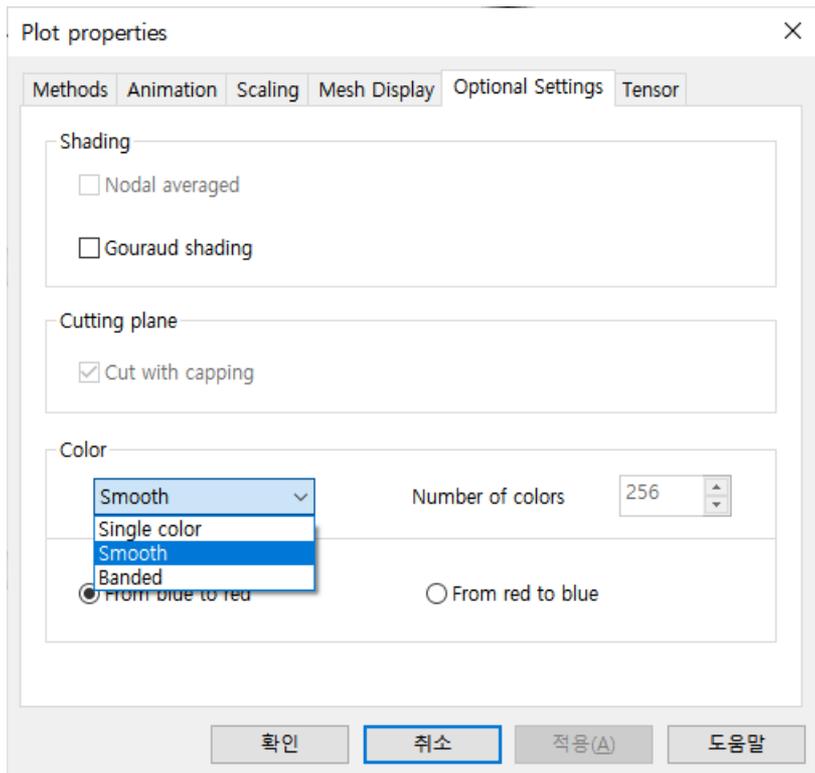
■ 새로운 레전드 옵션 변경:

- 색약을 가진 사람들을 기능 추가
- 실험 데이터에 가까운 결과 시각화 허용

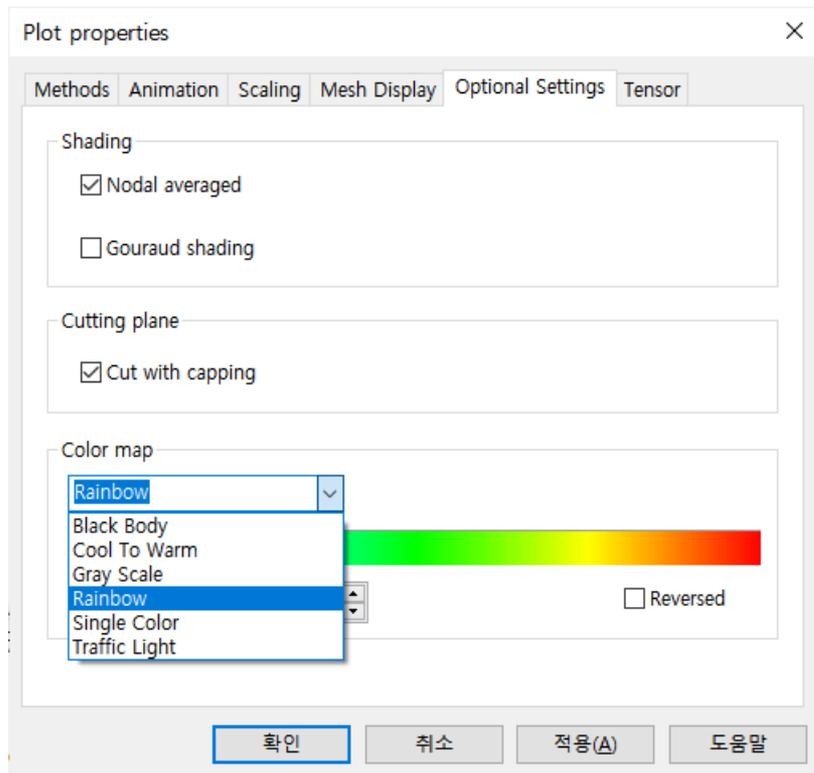


새 시각화 옵션

- 시각화 옵션 변경



Moldflow 2019



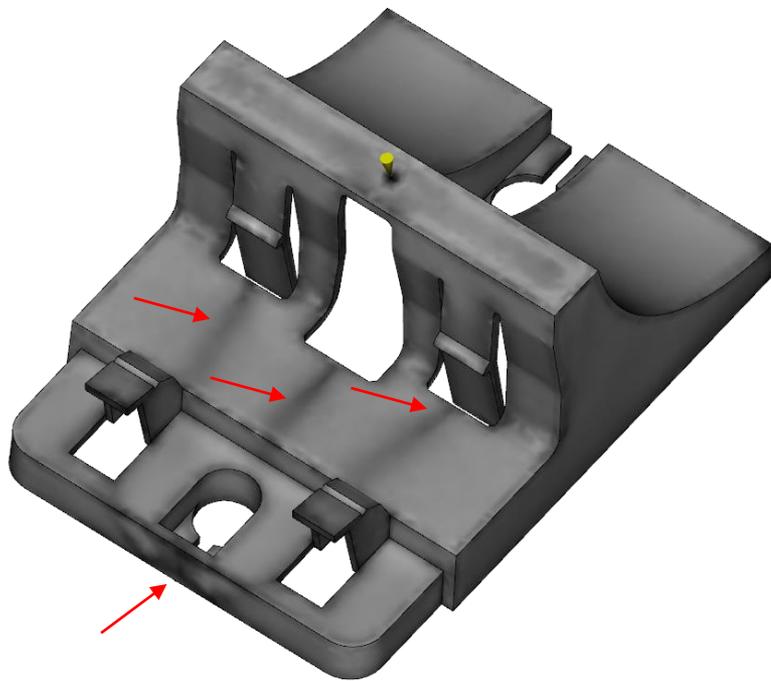
Moldflow 2021

https://www.youtube.com/watch?v=Yakq3_Ntlww

새 시각화 옵션

■ Examples

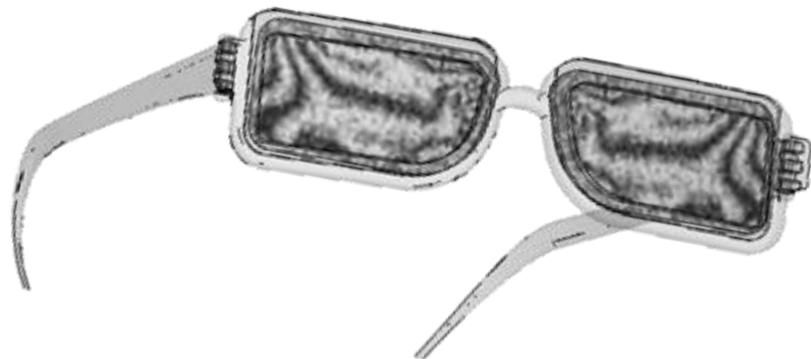
- 금속 플레이크가 있는 폴리머에서 가능한 가시적인 흐름 표시 평가



새 시각화 옵션

- Examples

- 회색 스케일의 복굴절



Automatic Packing Profile

- 축소 최소화를 목표로 하는 3D Mesh와 Midplane/Dual Domain에 대한 새로운 옵션
- V / P 스위치에서 패킹 압력 및 시간이 추정됨
 - 적절한 포장 압력. 가장 낮은 값
 - 80% of max. Inj. pressure
 - 80% of max. clamp force/projected area
 - Appropriate packing duration (일반적으로 과대 추정)
- 분석이 실행되는 동안 질량 변화율을 모니터링합니다.

Pack/holding control

Automatic

Automatic

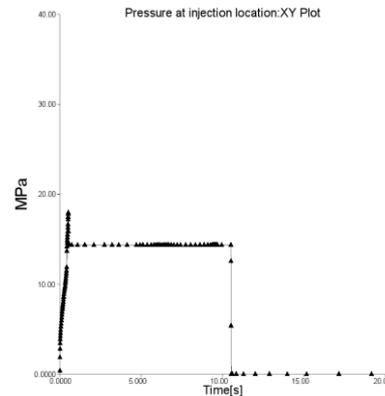
%Filling pressure vs time

Packing pressure vs time

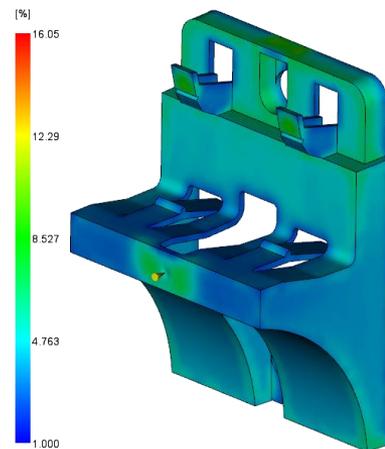
Hydraulic pressure vs time

%Maximum machine pressure vs time

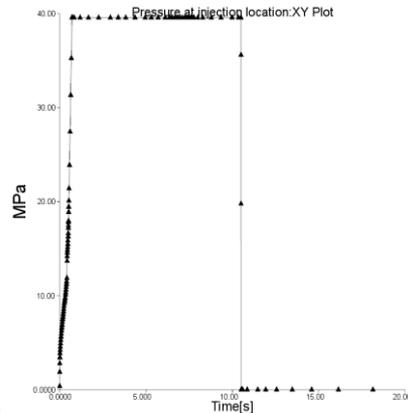
Default packing profile



Average volumetric shrinkage
Time = 30.51[s]



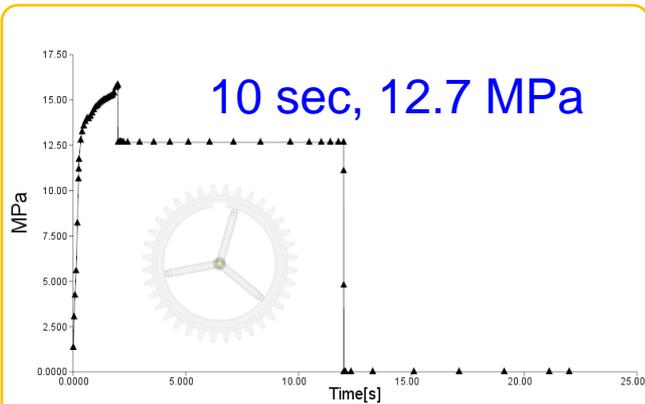
Automatic Packing



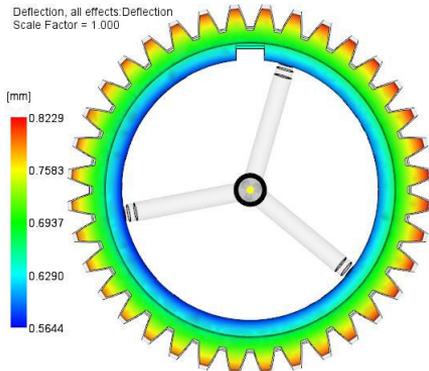
Automatic Packing Profile

- Example 1

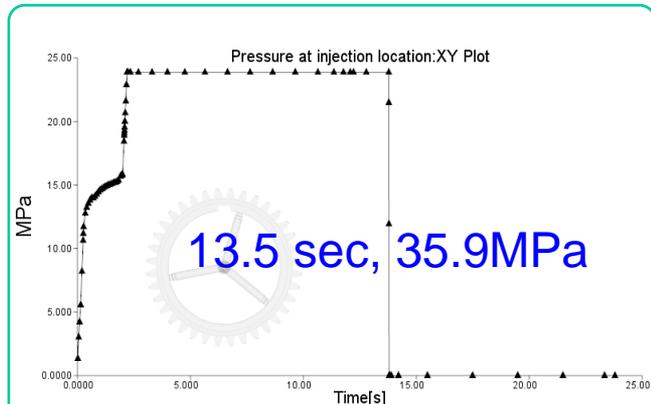
Mesh Type	3D Mesh
재료	POM
금형 온도	60 °C
초기 용융 온도	190 °C
충전 시간	2 sec



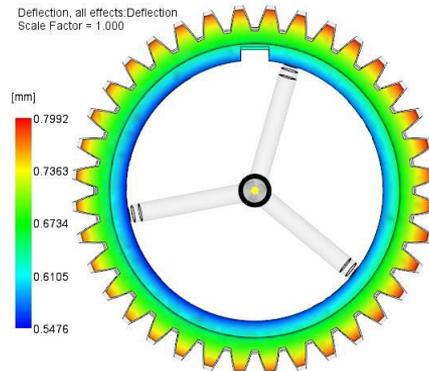
Deflection, all effects: Deflection
Scale Factor = 1.000



기존 Packing



Deflection, all effects: Deflection
Scale Factor = 1.000

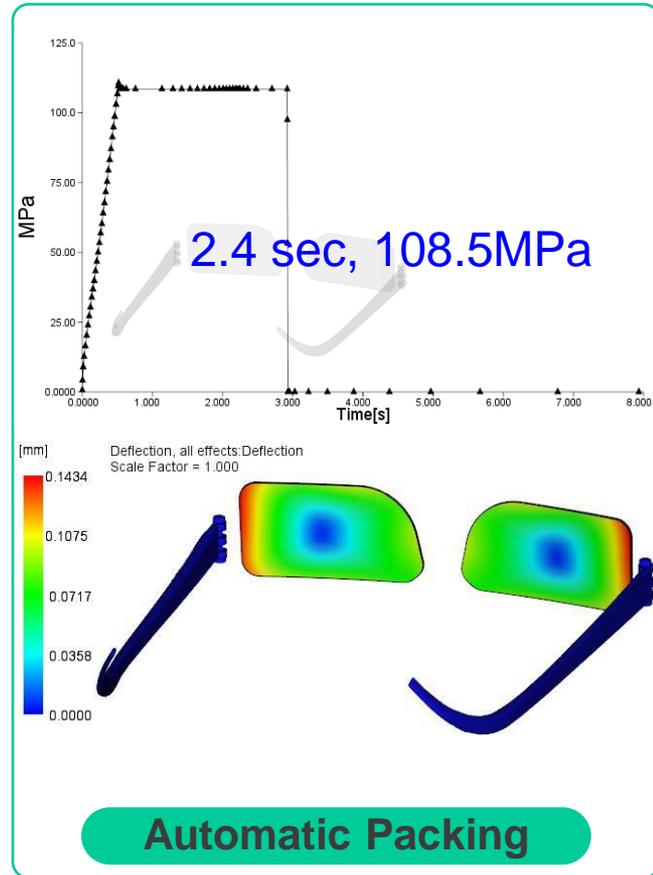
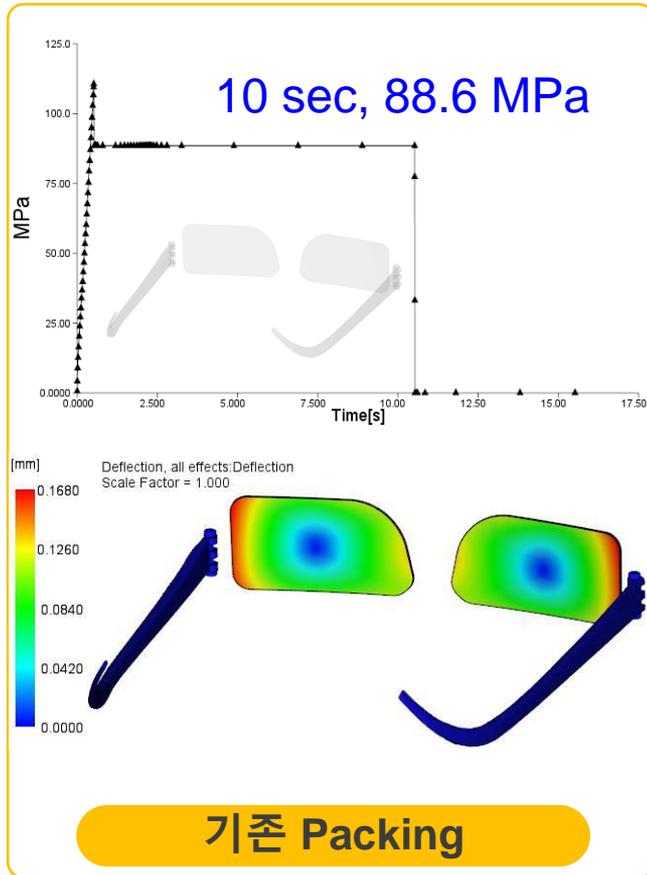


Automatic Packing

Automatic Packing Profile

- Example 2

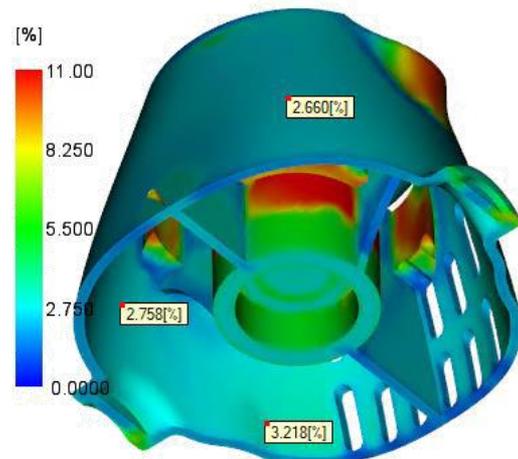
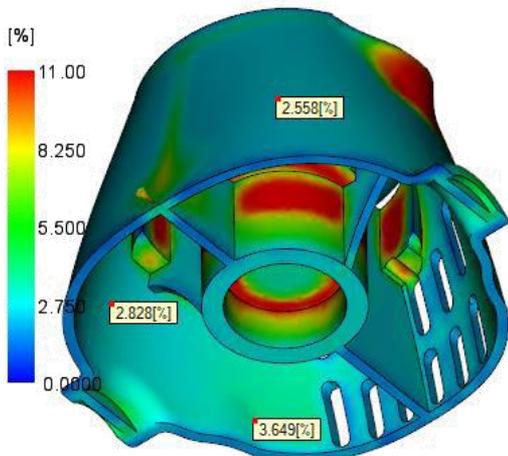
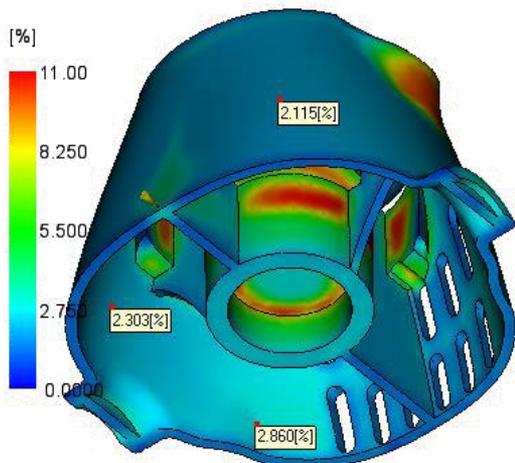
Mesh Type	3D Mesh
재료	PMMA
금형 온도	70 °C
초기 용융 온도	235 °C
충전 시간	1 sec



결정성 재료 체적 수축 Slover 개선

- 3D Mesh type의 결정성 재료 체적 수축 계산 개선
 - 3D Mesh와 Midplane/Dual Domain간의 일관성 향상
 - 2019 Version 대비 3D 의 체적수축 계산의 개선되어 높게 나타남
 - Solver에 개선 내용임

Average volumetric shrinkage
Time = 19.09[s]



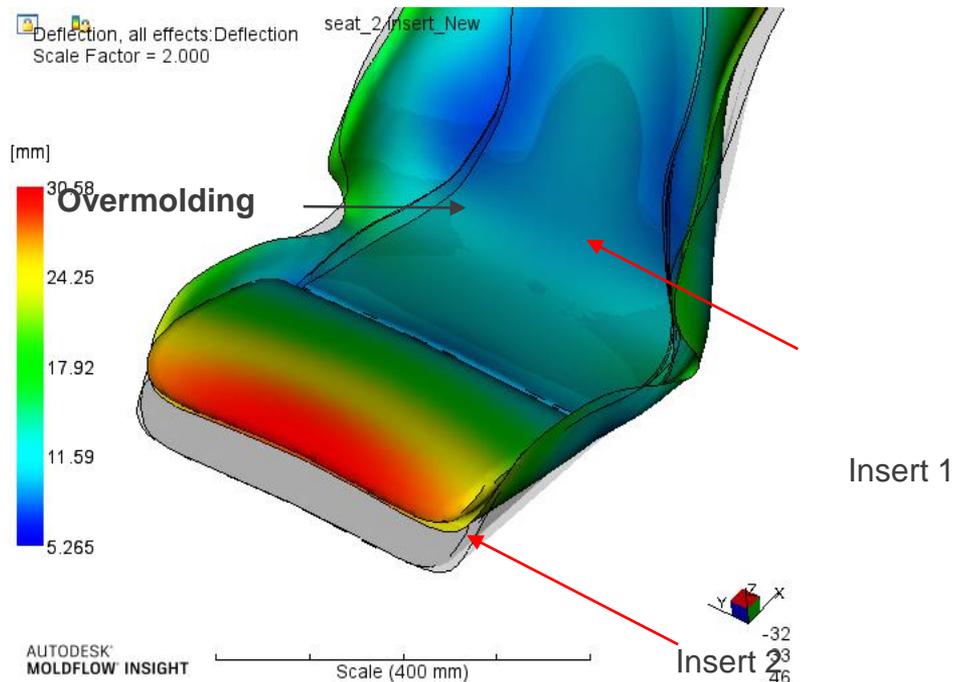
3D 2019

3D 2021

Dual Domain

Insert to Insert contact in warp

- Overmolding에서 설명한 Insert 접점을 삽입할 때:
 - 연결 인서트는 함께 'glued' 됨
 - 기존 Version에서는 Insert와 Insert간의 Node를 일치 시킨 후 Merge 적용하는 번거로움을 개선



기타 솔버 개선 사항

- 기계적 속성 계산의 개선
 - 일부 재료에 대한 Midplane/Dual Domain의 변경(현재 3D와 일치함)
 - 섬유 충전 또는 디스크 충전 폴리머의 기계적 특성이 개선됨
- 3D 흐름 개선
 - 향상된 3D Weld surface 예측.
 - 3D Flow 밸브 게이트 정확도 향상
 - 3D Core Shift 정확도 향상
 - 개선된 3D 미세 다공 발포 예측 : 구조, 기계적 특성 및 힘 개선
- Midplane/Dual domain 흐름 개선
 - 배럴 압축성 향상
 - 기본적으로 프로 파일링된 결과 쓰기
- Cool (BEM) 솔버 수치 정밀도 향상.

기타 솔버 개선 사항

- Solver API 변경
 - 새로운 Solver API 옵션
 - 1) User Node fields
 - 2) Fiber Orientation
 - 3) Injection and time step control
- 3D 좌굴 분석 개선
 - 10배 더 빠른 계산 속도, 메모리 사용량 75% 감소

The background features a complex geometric design. On the left, there are several overlapping, curved, light blue shapes that resemble stylized waves or folds. On the right, a darker blue, angular shape is visible, possibly representing a folded piece of material or a specific component. A white diagonal line runs from the top right towards the center. In the background, a faint grid of vertical lines is visible, suggesting a technical or scientific context.

New Foaming Option

New Foaming Options

- PU Foaming
 - PU 발포 또는 일반 화학 발포제 반응
 - 성형 해석 시 발포 가스를 발생시키는 반응을 고려
 - 수지의 경화를 위한 별도의 반응 분석도 존재
(Gelling 반응, Blowing 반응)

- Reactive Microcellular Injection Molding
 - 열 경화성 소재를 사용한다는 점을 제외하면 열 가소성 미세 다공 사출 성형 공정과 유사



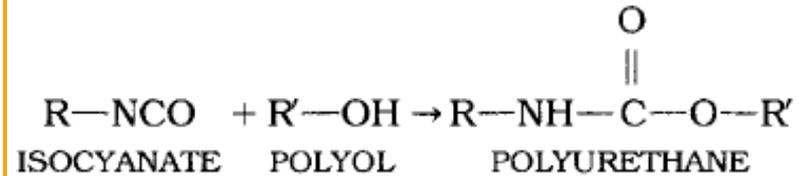
New Foaming Options

- PU Forming

- 겔화 (경화) 반응

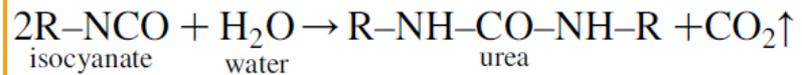
열경화성 수지의 경화 과정에서 발생

Isocyanate와 Polyol가 만나 경화되면서, 열 발생



- 발포 반응

Isocyanate와 물이 만나면서 CO₂가 발생하면서 발포 반응이 발생



New Foaming Options

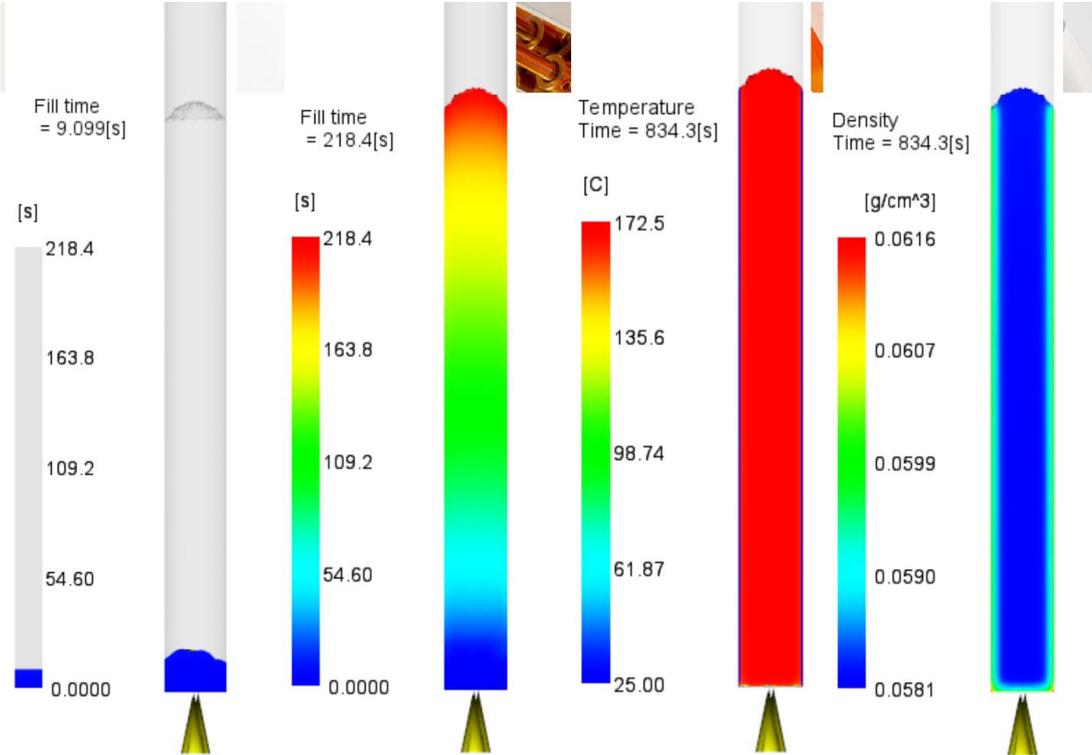
- PU 발포 공정

- 일반적으로 전체 체적의 2.5 %

초기 주입

- 나머지 97.5 % 를 발포에 의한

Cavity 충전



기타 변경사항

The background features a series of vertical, slightly curved blue bars of varying heights, creating a textured, architectural effect. A large, white, diagonal shape cuts across the scene from the top right towards the bottom left, partially obscuring the blue bars. The overall color palette is light blue and white, with a clean, modern aesthetic.

CAD 지원 Platform 업데이트

- 이제 다음과 같은 CAD 파일 형식도 지원
 - Alias 2020
 - Autodesk Shape Manager 226
 - CATIA 6R2020
 - CATIA 6R2020 Assembly
 - Creo™ Parametric 7.0
 - Inventor 2021
 - Inventor 2021 Assembly
 - Parasolid® V32
 - Rhino 6.0
 - SolidWorks 2020

Material database

- 2019.0.5 이후 열가소성 플라스틱 데이터베이스 업데이트
 - **Total number of grades: 11471**
 - Grades added: 623
 - Grades deleted: 145
 - Grades amended: 533
 - **Total number of suppliers: 569**
 - New suppliers added: 44
 - Suppliers deleted: 24

Summary

■ Moldflow 2021 Update 사항

- Simulation Compute Manager(SCM) 변경
- Sink Mark 개선, Automatic Packing Profile, 결정성 재료 체적 수축 Slover 개선, Insert to Insert contact in warp, 새로운 시각화 옵션 등등
- PU Forming 추가

■ 한계

- Simulation Compute Manager(SCM)은 Web browser를 사용하지만 온라인 사용은 어려움
- 현재 영문 Version으로 한글 지원하지 않음 (폴더도 역시 영문 사용)

감사합니다.

 JK ED&C  AUTODESK.

