Crane System

CAD Final Project

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Team Crane

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Introduction

Background

- 굴착기나 크레인 등 중장비들의 회전, 병진 운동이 CATIA로 표현하기 적합하다고 판단
- 이론, 실습시간에 배운 기능을 활용하여 구현 가능

Introduction

Roles

김용호

Mobile Crane

Part Design
Kinematics
Simulation

김응환

Dump Truck

Part Design
Kinematics
Presentation

박지원

Excavator

Part Design
Kinematics
Simulation

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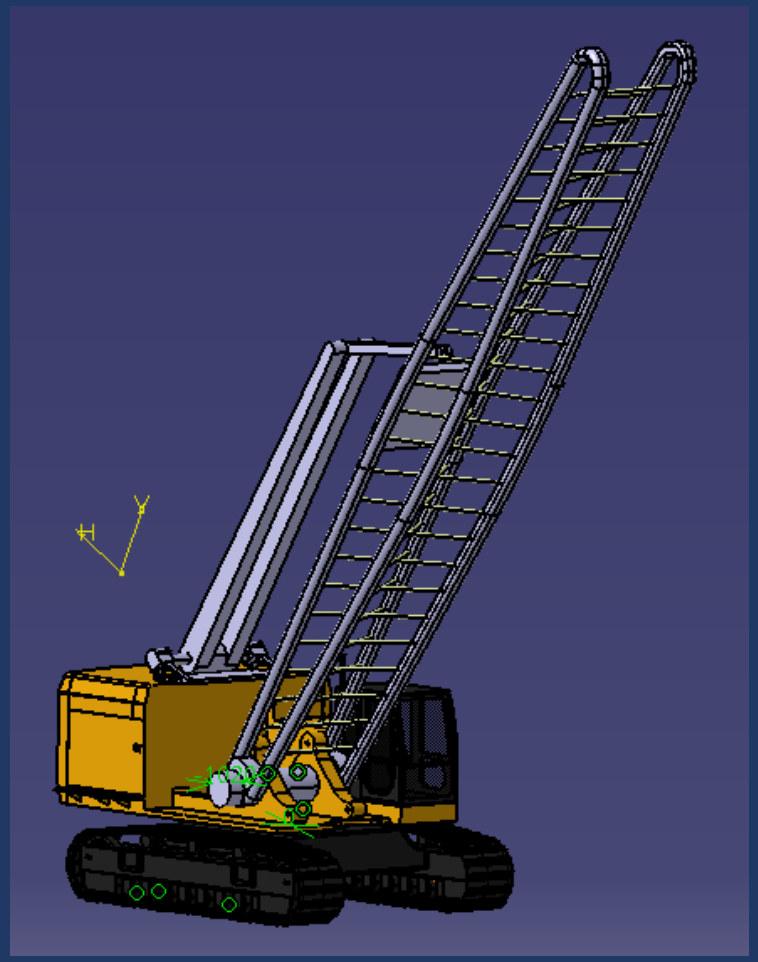
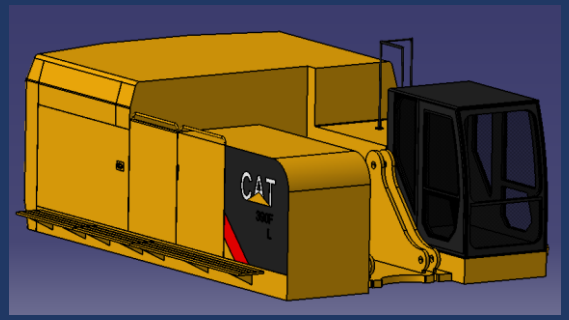
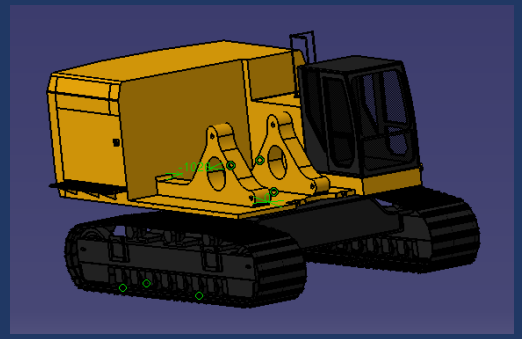
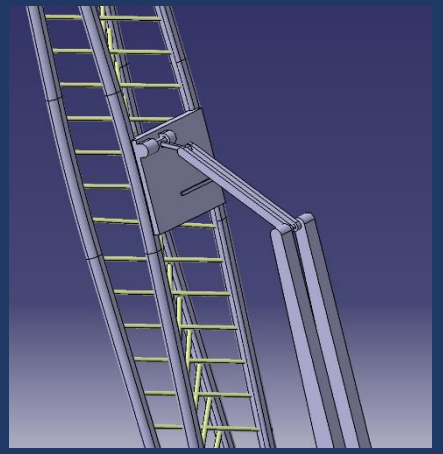
Modeling

Mobile Crane





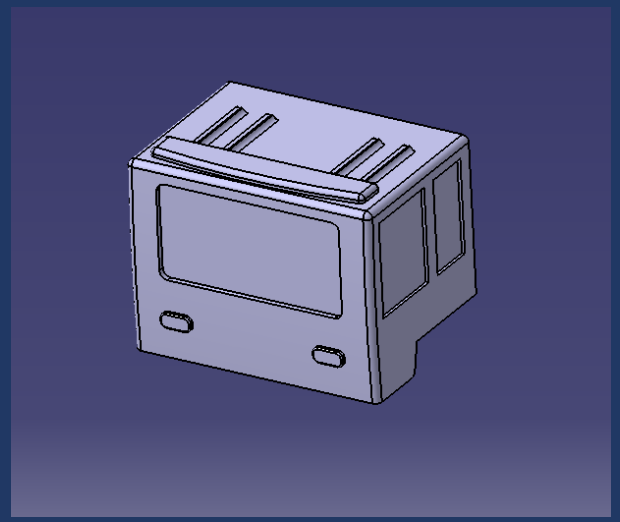


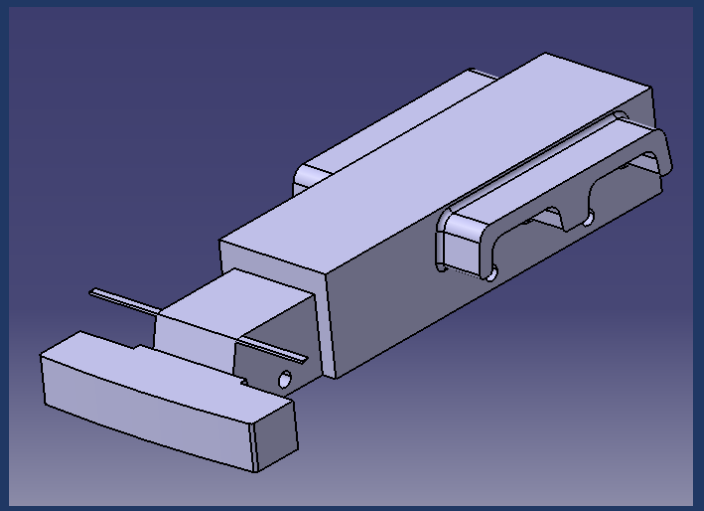


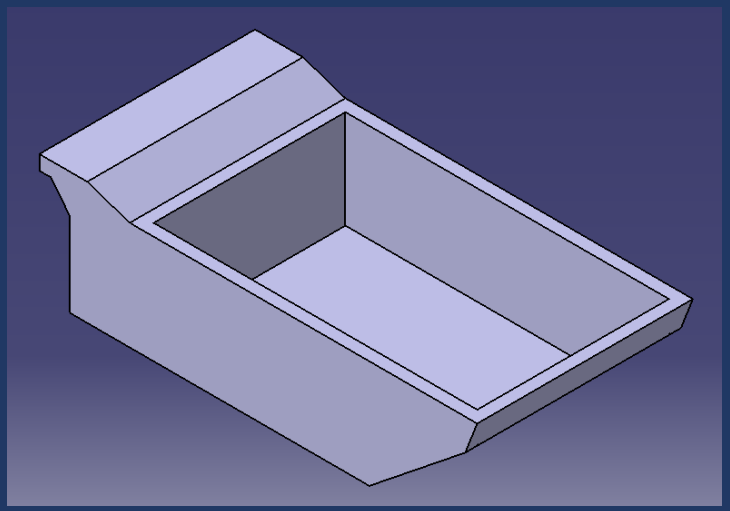
- Main body , Main Link, Sub link1,2,3,4 부분으로 나누어 모델링
- Main body부분을 아웃소싱하여 변형
- Link를 여러 개 사용하여 각도를 크게 변형하는 joint와 세밀하게 각도를 변경 할 수 있는 joint 구분
- Sketch, Pad, Pocket, Edge Fillet를 이용하여 전체적인 형상 제작
- GSD-Cylinder로 Truss 구조 제작
- Traction 아웃소싱

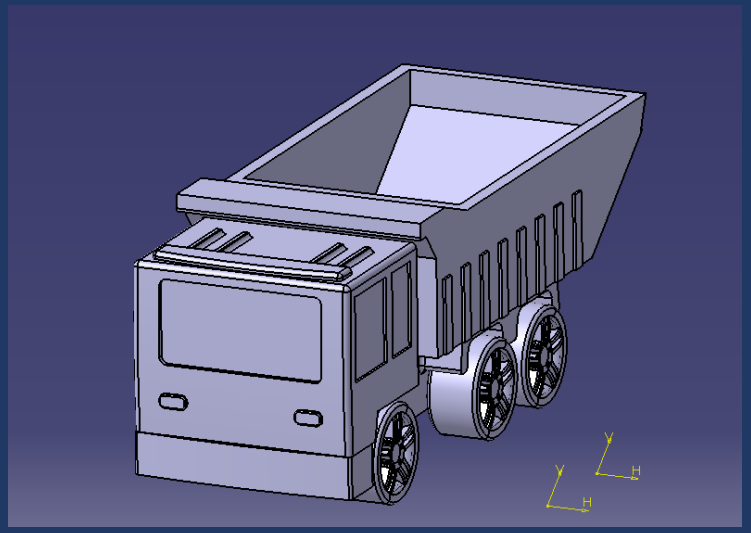
Modeling

Dump Truck





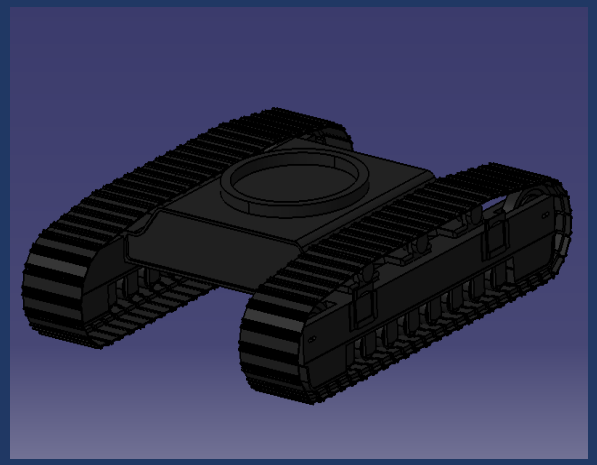


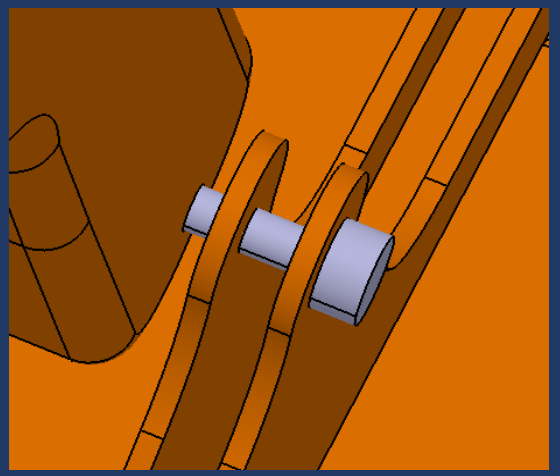


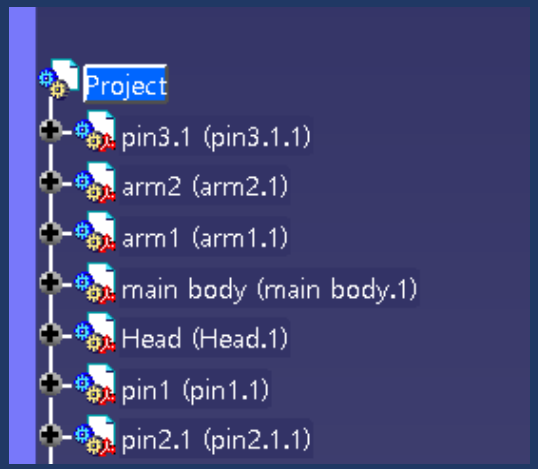
- Main body , Arm , Head 부분으로 나누어 모델링
- Sketch, Pad, Pocket, Edge Fillet을 이용하여 전체적인 형상 제작
- Assembly Design의 Coincidence, Contact, Offset Constraint를 이용하여 모든 Part 조립
- Wheel, 아웃 소싱

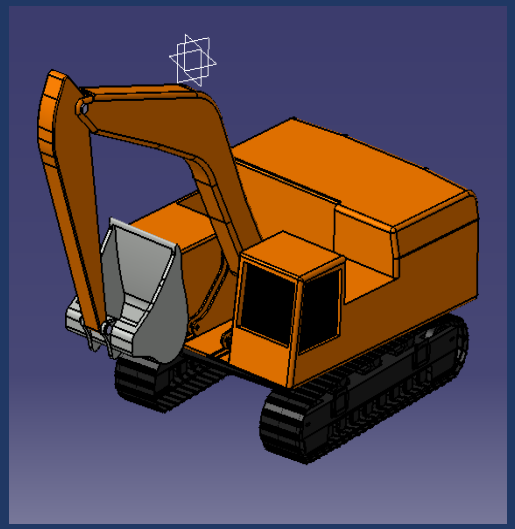
Modeling

Excavator









- Main body , Arm , Head 부분으로 나누어 모델링
- Sketch 와 Pad 를 기반으로 전체적인 형상 제작
- Boolean Operation 의 Remove 기능을 활용하여 비어있는 형상인 Head 제작
- 제작한 Pin으로 연결부분 구현
- 궤도 부분의 Traction body , Traction wheel 아웃소싱

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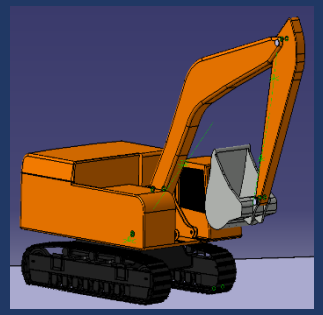
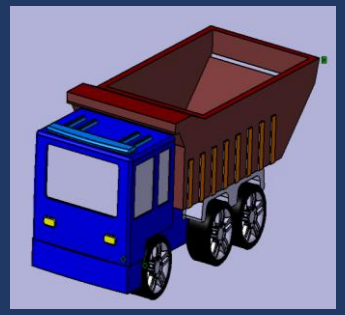
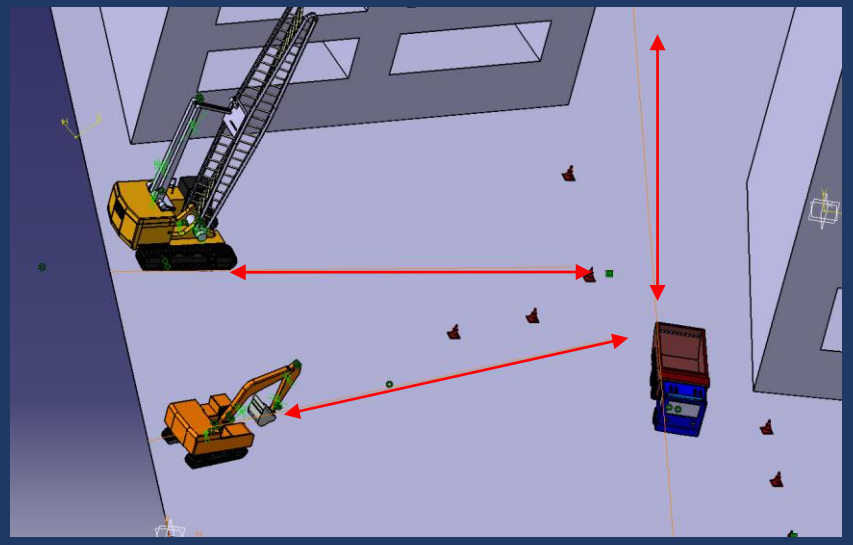
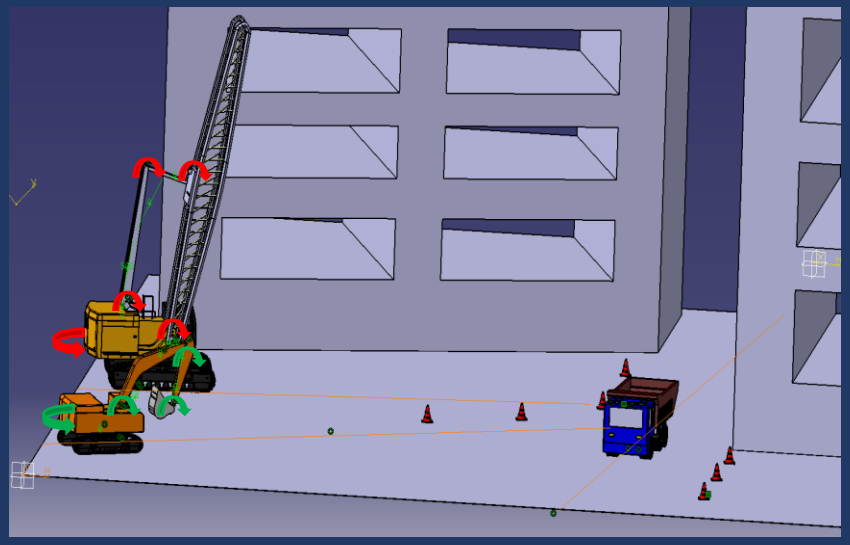
Kinematics





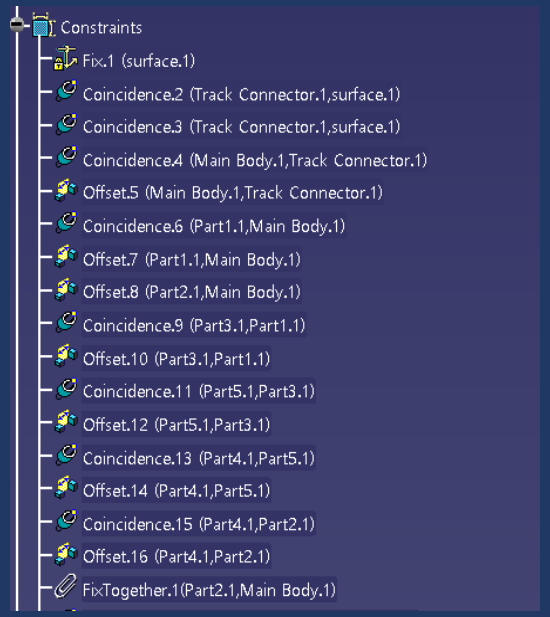
- Constraint : Coincidence, Offset, Contact활용
- Kinematics : Revolute , Rigid , Prismatic활용
- 각 Product가 활동하기 위한 Surface제작
- Product들의 이동경로를 Line 으로 설정

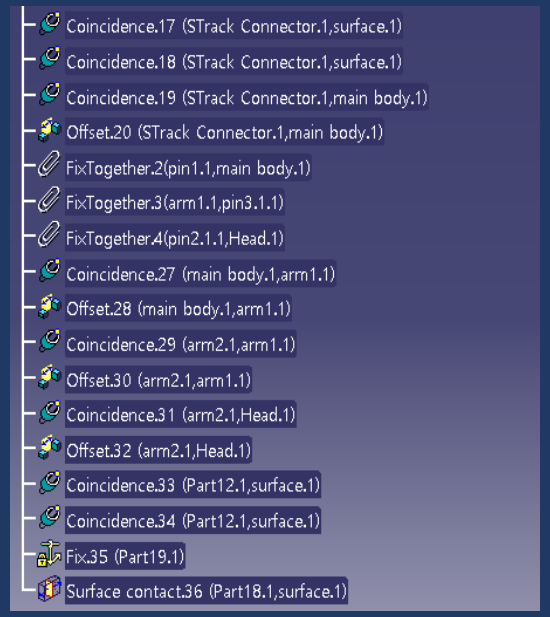




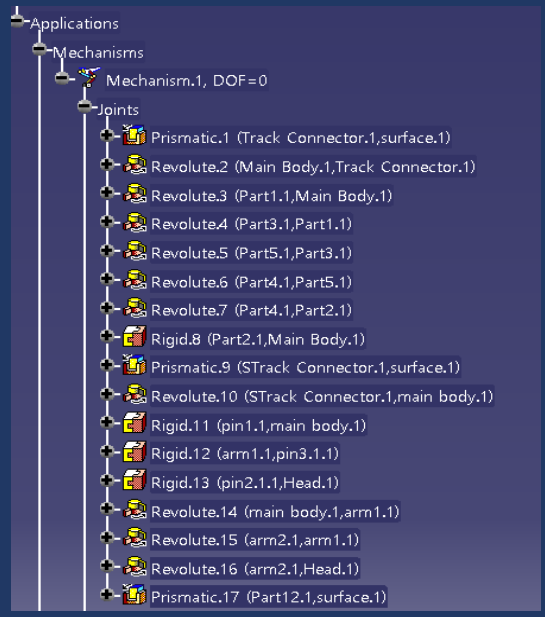
Kinematics

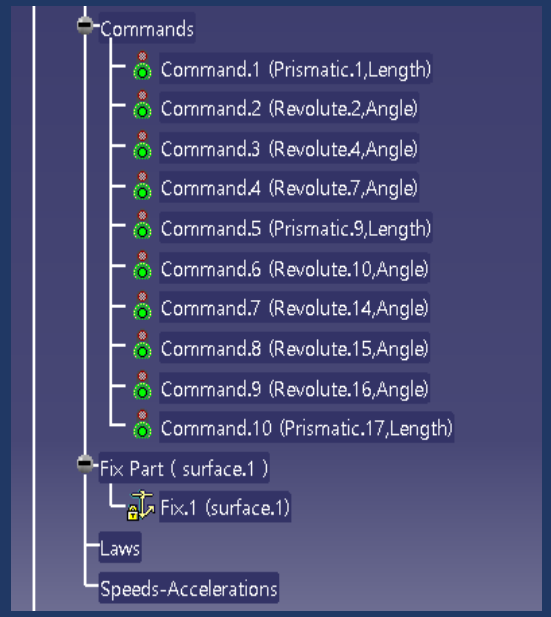
Constraints



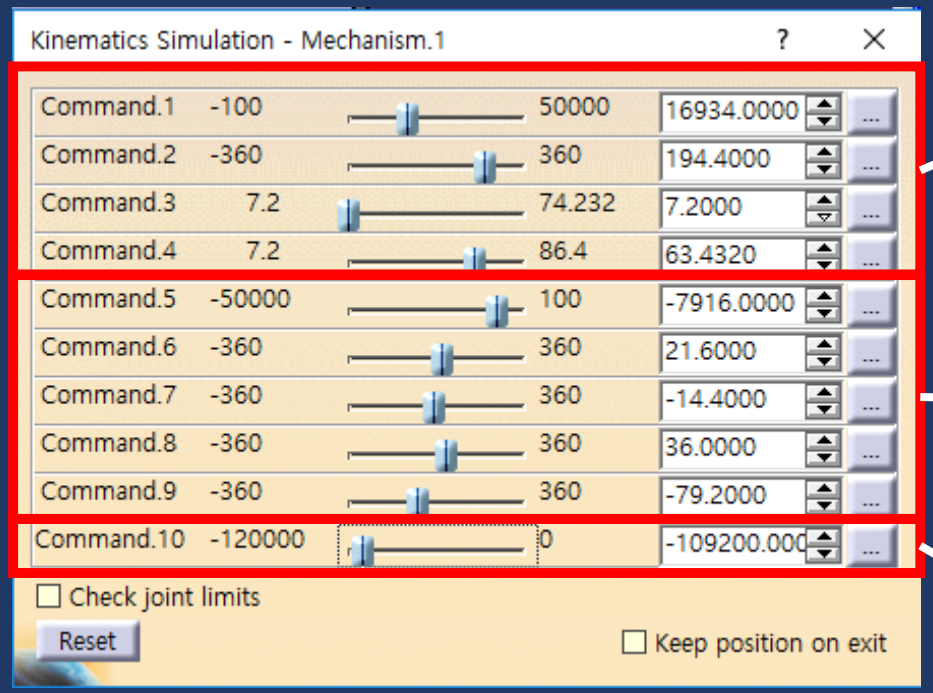


Kinematics





Simulation



Crane

- Command 1 = Crane 의 병진운동
- Command 2 = Main body 회전운동
- Command 3 = Sub link 회전운동
- Command 4 = Main link 회전운동

Excavator

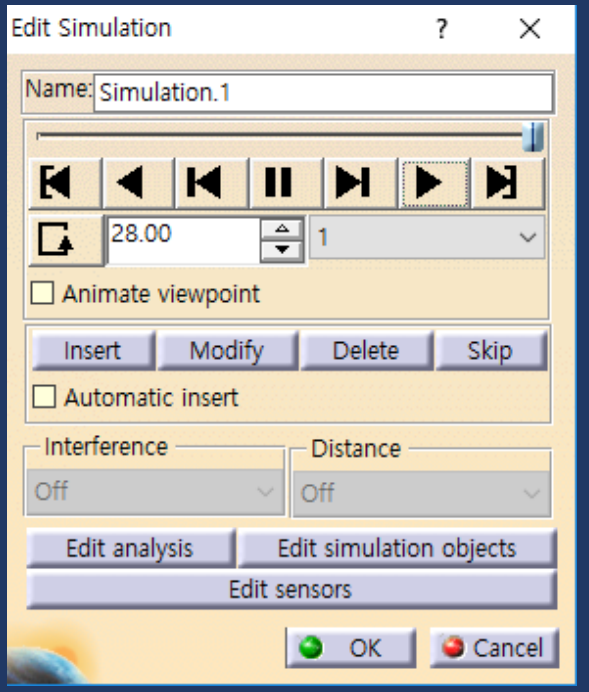
- Command 5 = Excavator 병진운동
- Command 6 = Main body 회전운동
- Command 7 = Arm 1 회전운동
- Command 8 = Arm2 회전운동
- Command 9 = Head 회전운동

Dump truck

- Command 10 = Dump truck 병진운동

Simulation

Crane system (Using CATIA V5) - YouTubeCrane system (Using CATIA V5) - YouTube



- Simulation 하나, 28장면으로 구성
- 각 Product와 Part 가 간섭받지 않는 각도, 이동 길이를 확인하여 제작

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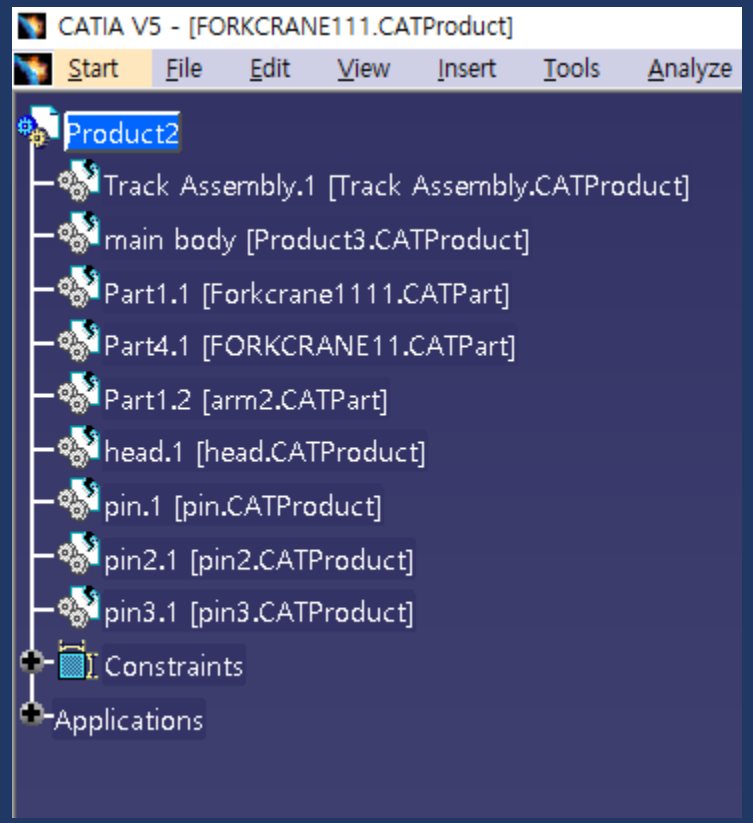
Conclusion



- 각자 맡은 차량을 합치는 과정에서 Part와 Product 저장 경로가 정확하지 않아 시간 소비
- Part와 Product의 저장이 체계적이지 않아 시간 소비
- 각 Part의 구체적 수치가 없어 비율을 맞추는데 어려움을 겪음
- 바퀴가 회전하는 Kinematics를 구현하지 못함
- Crane의 도르래 부분을 구현하지 못함