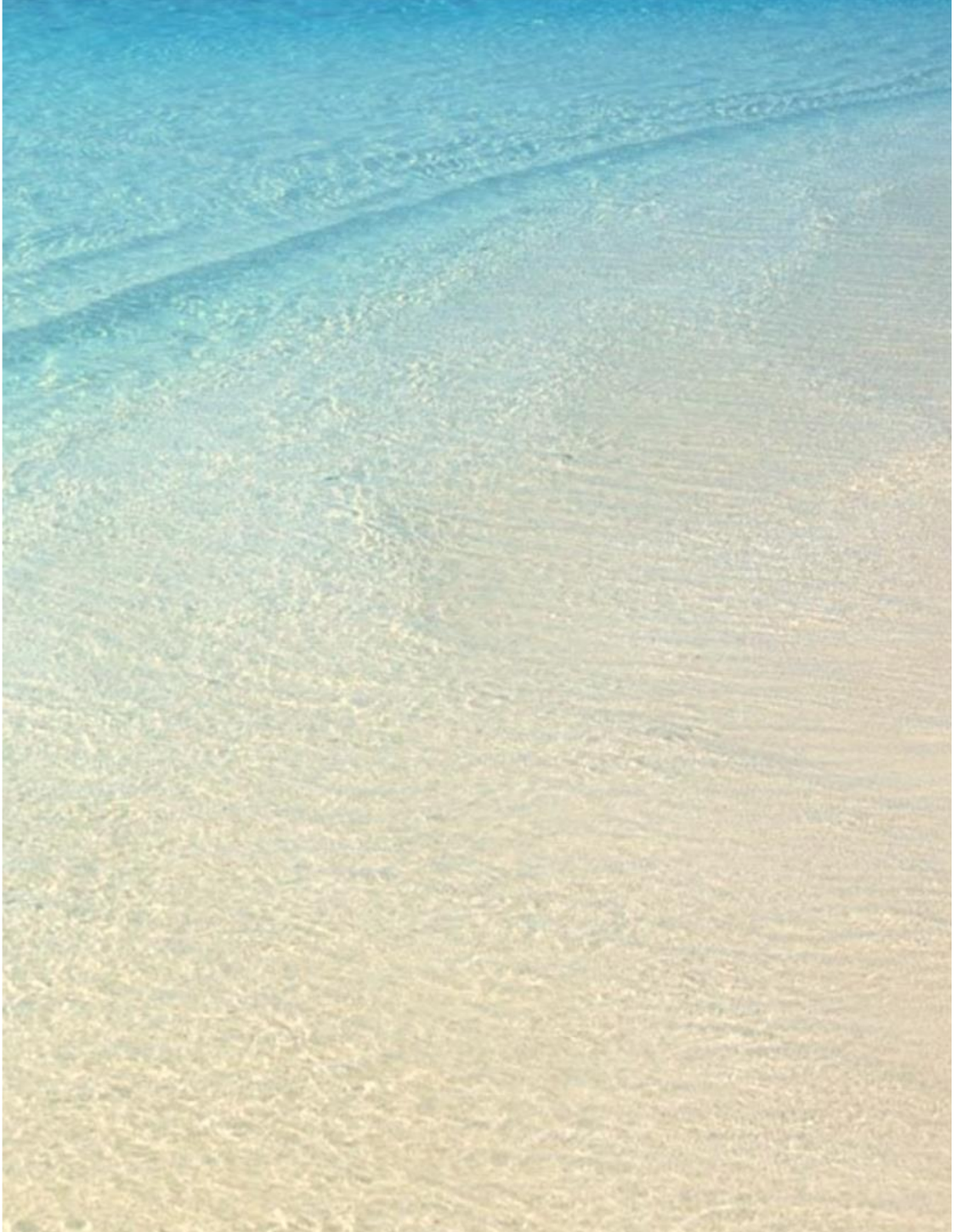
Sightseeing Vehicle

Team 코리얀센
2018015896 김성현
2018016062 윤병진
2018016244 추현욱



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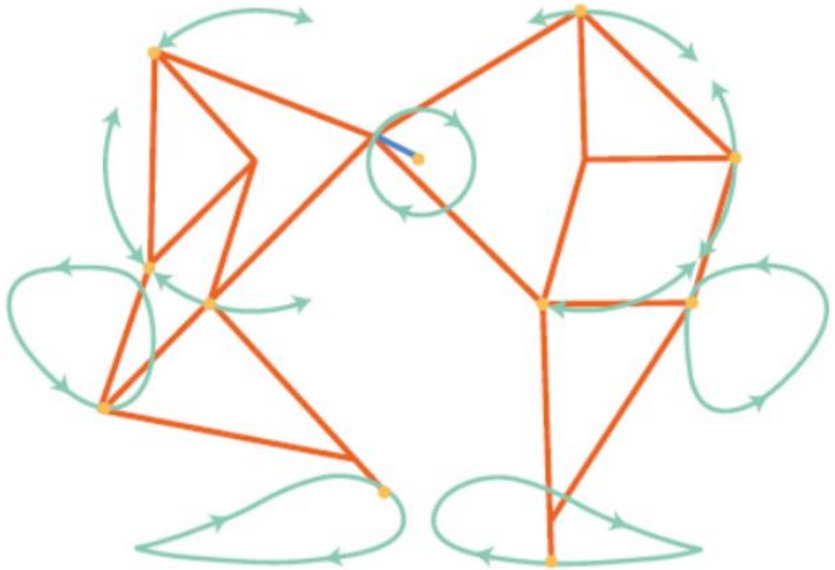
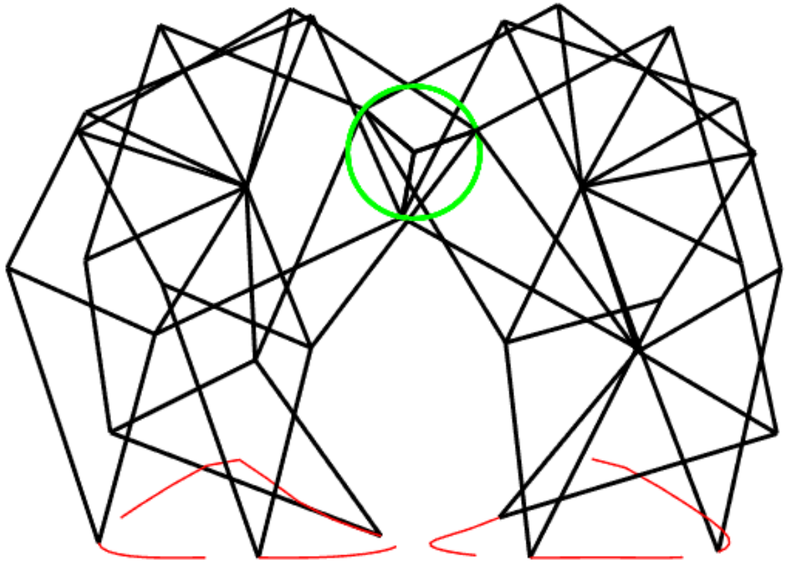
주제 선정

주제 선정 과정, 역할 분담





Theo Jansen's mechanism

Theo Jansen의 키네틱 아트에 대해 알고 있었음

(과거 한국 전시 관람 경험 有)

-> CAD 수업에서 배운 CATIA 기능을 활용해 구현해보자!

"Sightseeing Vehicle"

Traveling

01

다가오는 여름을 배경으로

02

바람을 동력으로하는

친환경 Mechanism

03

바람이 많이 부는 해변의

장점을 이용

아이디어 참고 자료 출처 : https://www.youtube.com/watch?v=NaHE668A3QQ

역할 분담

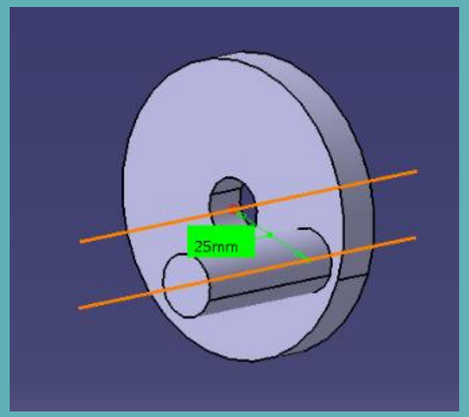
팀원	맡은 역할
김성현	정보 수집, 프로펠러 및 웜기어 메커니즘 (Part Design, DMU Kinematics), ppt 제작
윤병진	정보 수집, 테오 얀센 메커니즘 (Part Design, DMU Kinematics), sequence 생성
추현욱	정보 수집, GSD로 탑승 부분 제작, 전체 파트 및 메커니즘 Assemble, 영상 제작

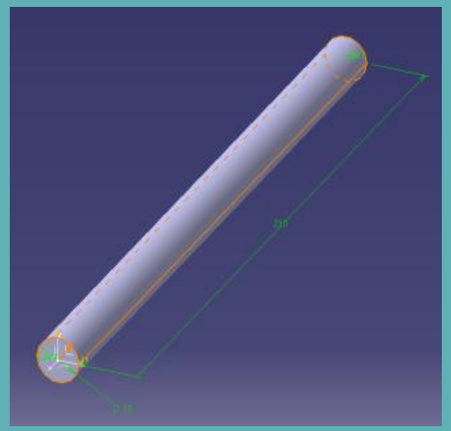
02

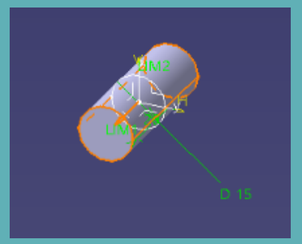
설계 과정

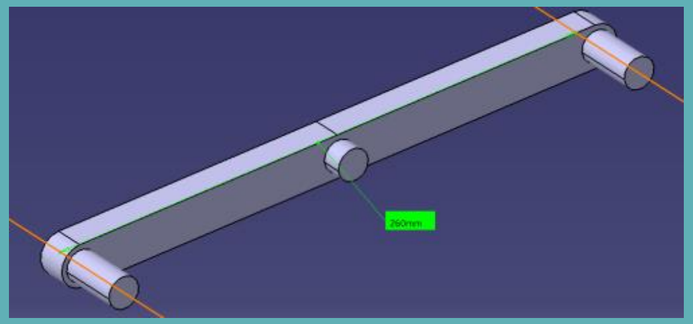
도면, Part Design, DMU Kinematics

Theo Jansen's Mechanism _ Part Design









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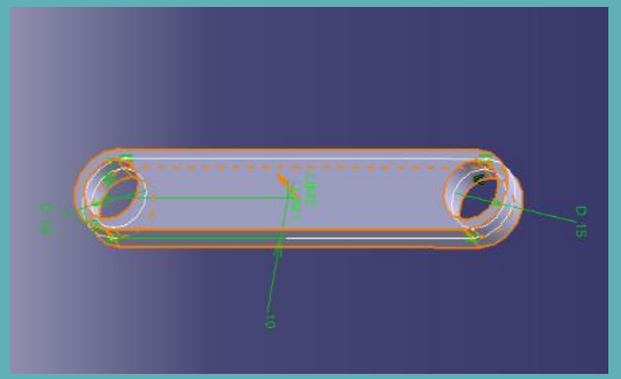

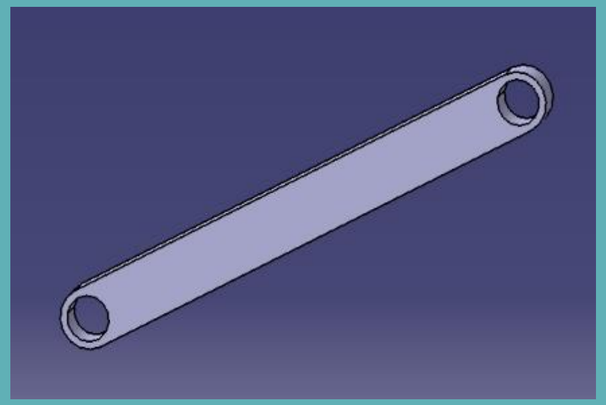

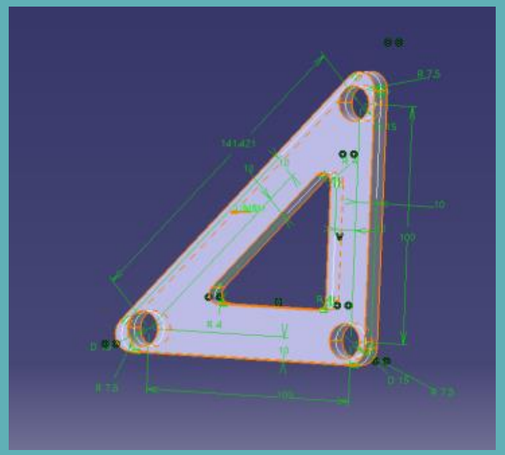

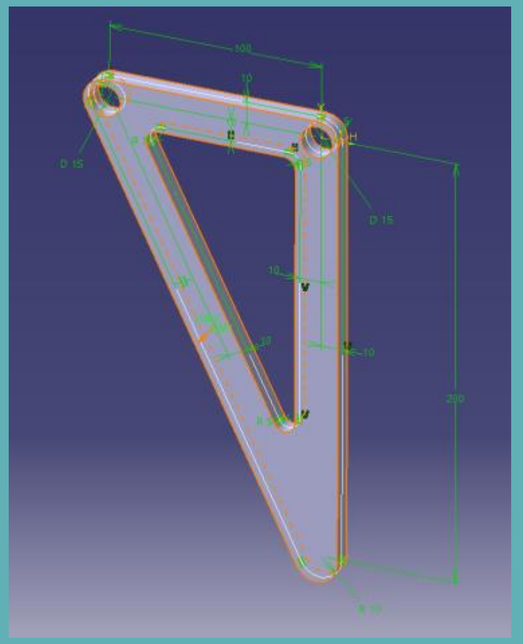

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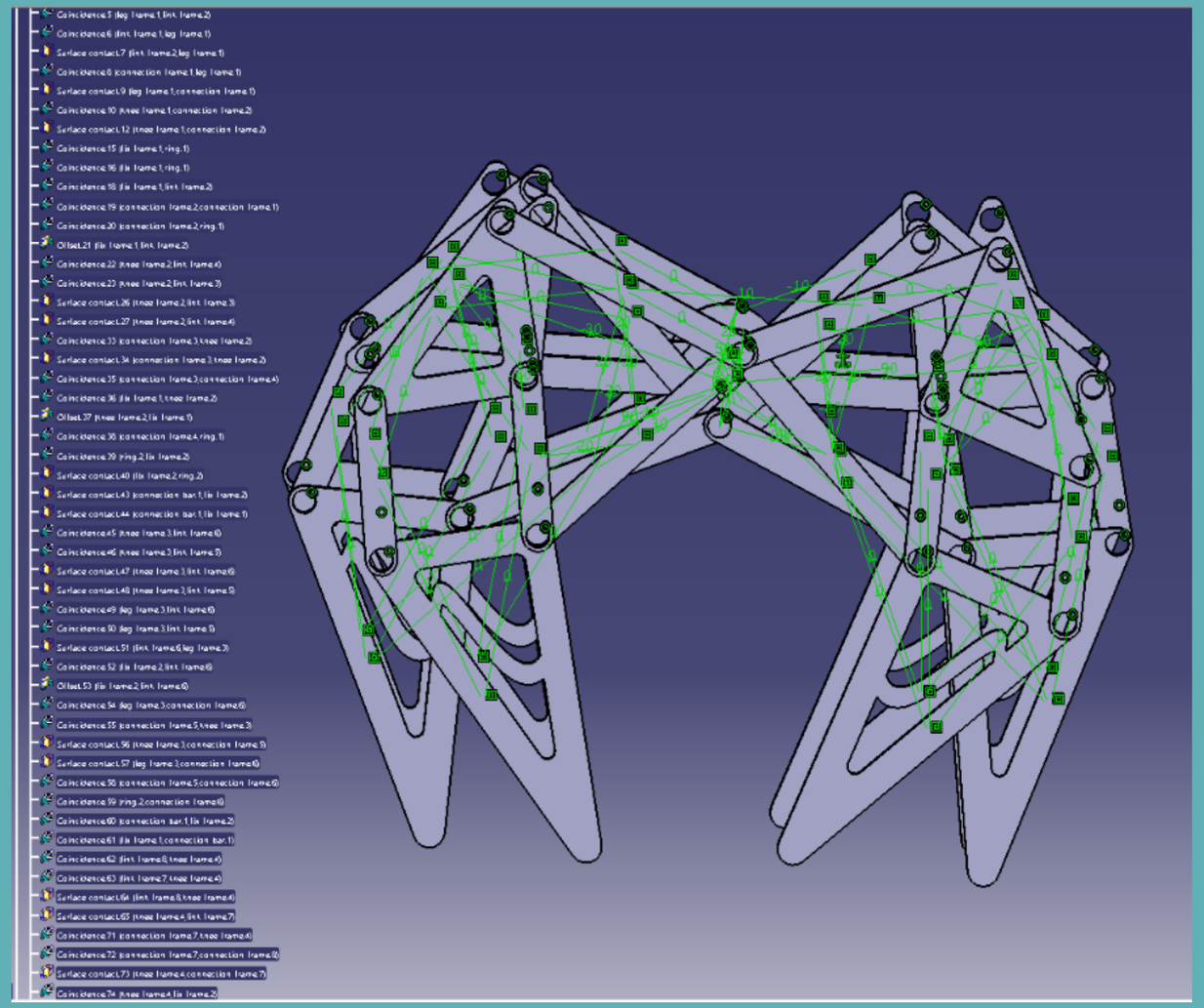
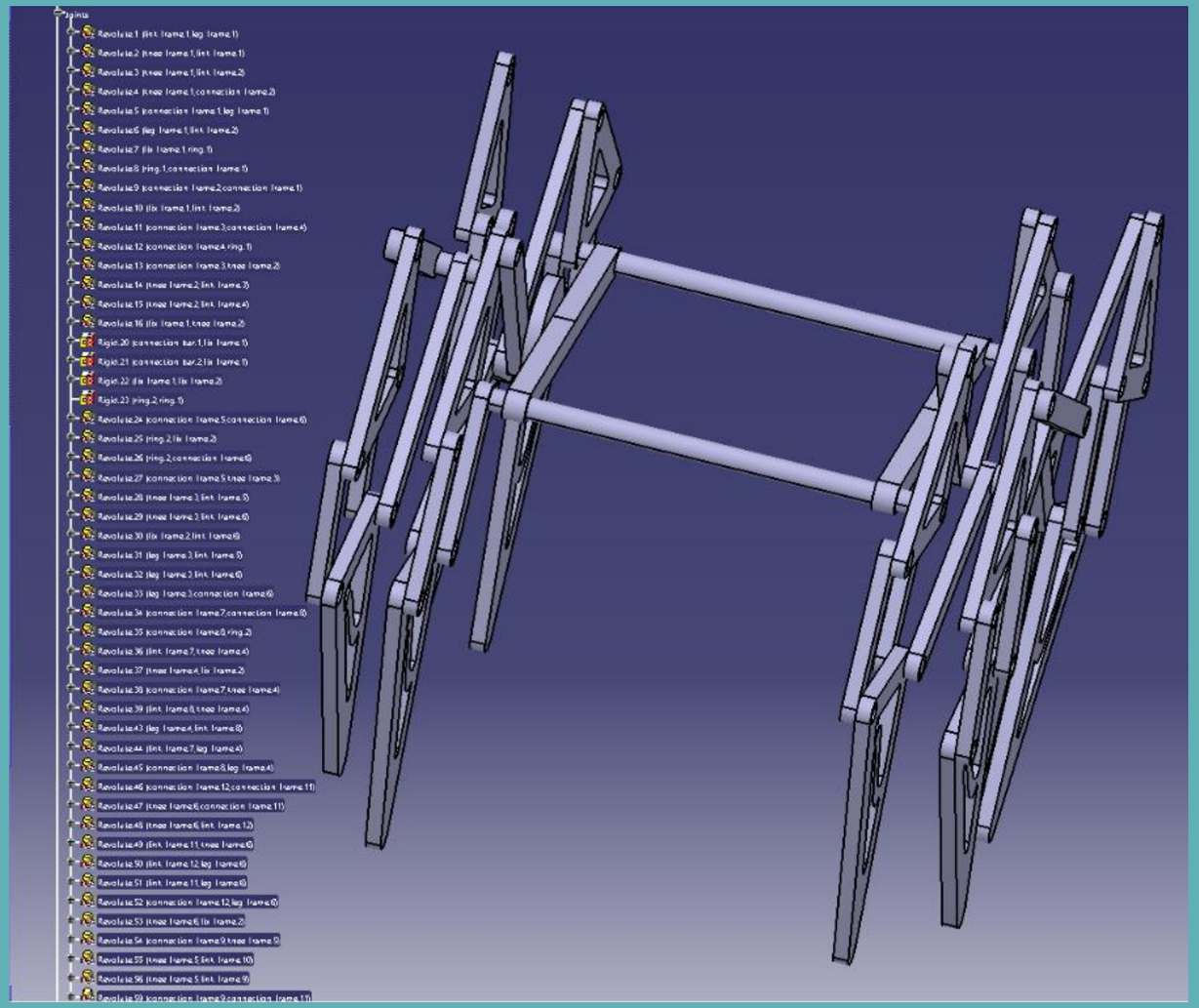
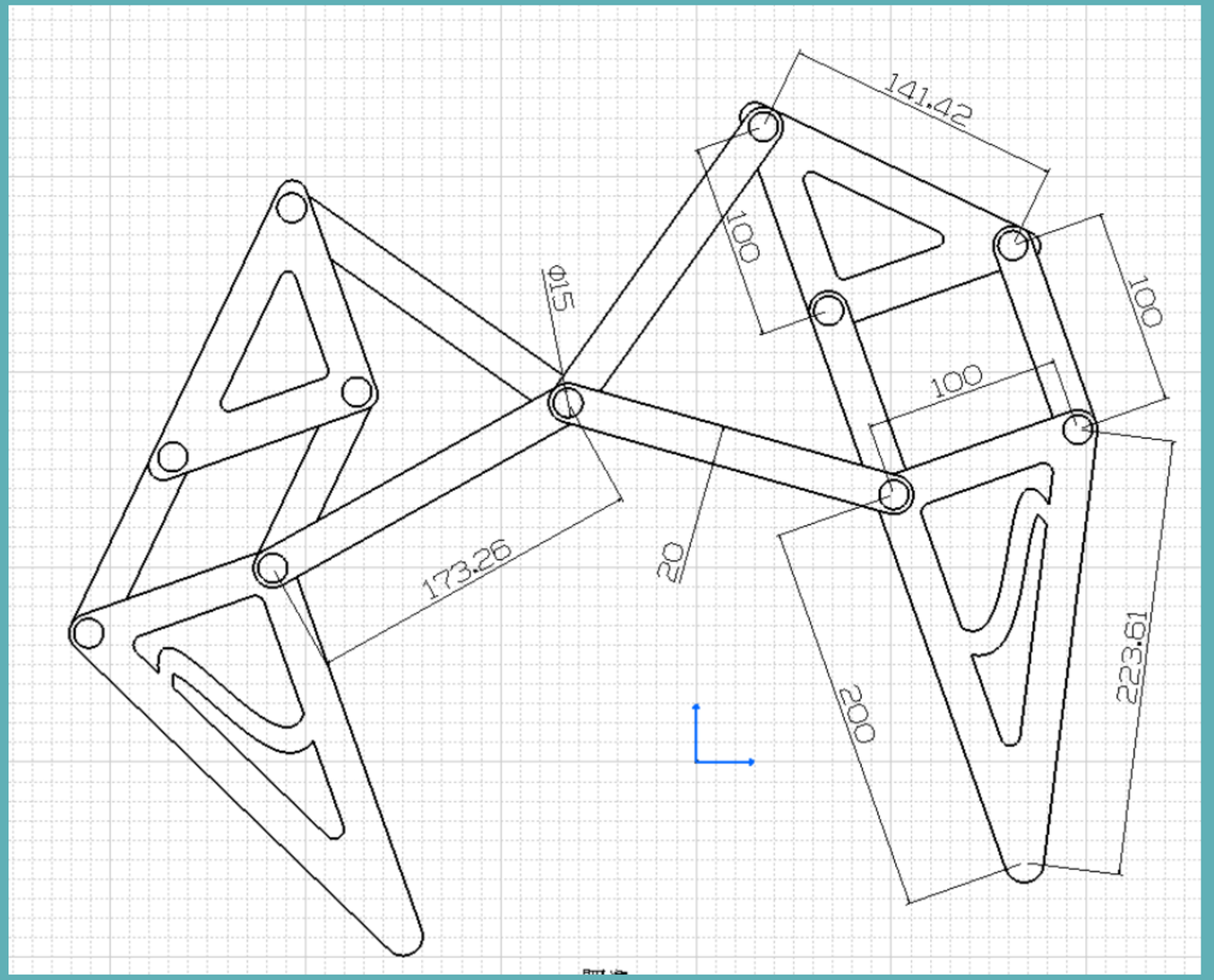
Theo Jansen's Mechanism _ Product





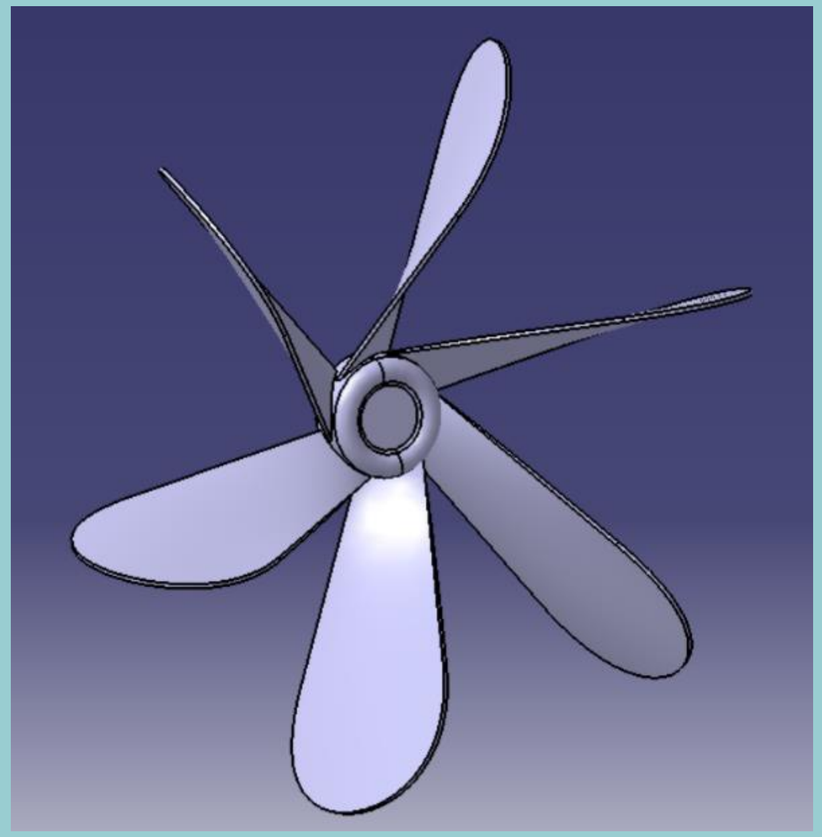
<Assemble & Joint>

Theo Jansen's Mechanism _ Draft

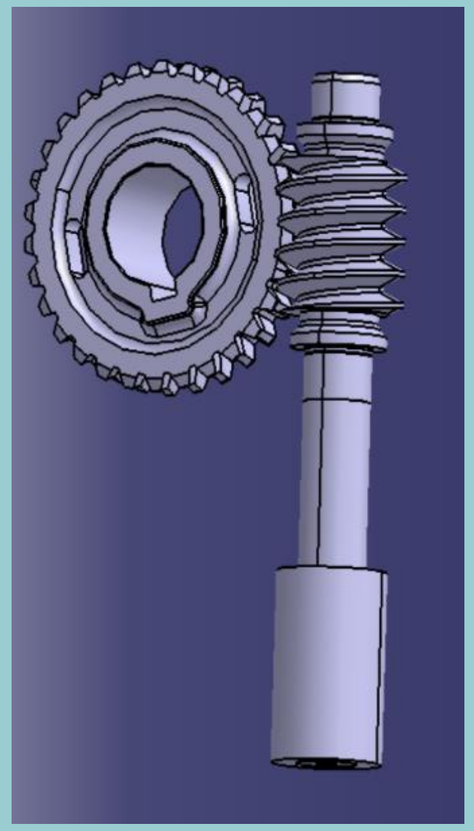


치수 정보 출처 : https://www.youtube.com/watch?v=KgvHTlJ55vU

Propeller & Gear _ Part Design

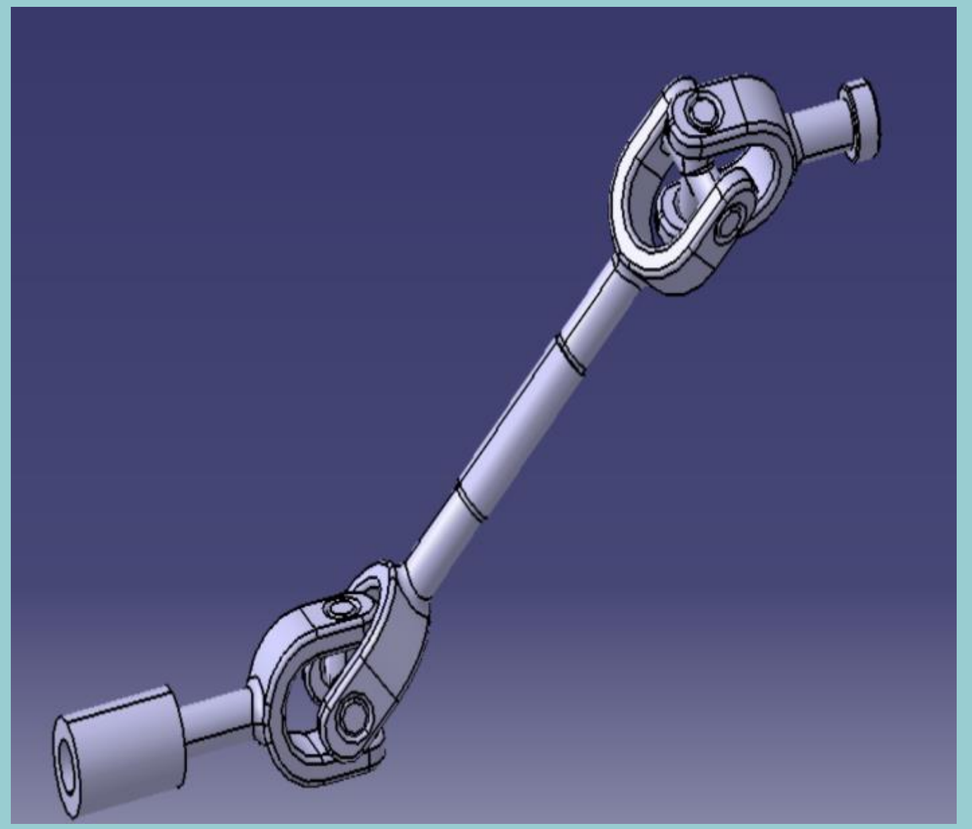


<Propeller>



<Worm Gear>

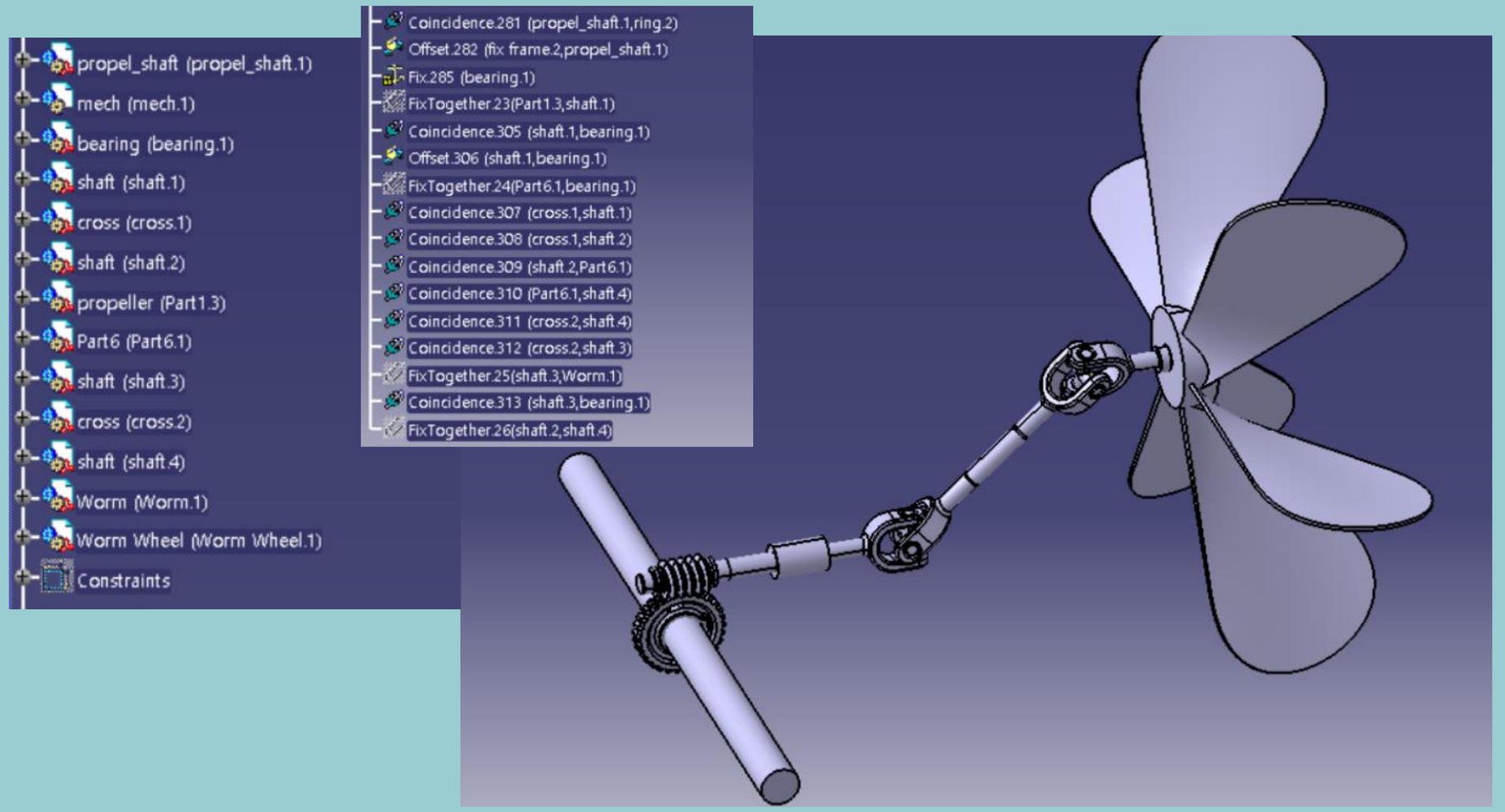
↑ Outsourcing



<Universal joint>

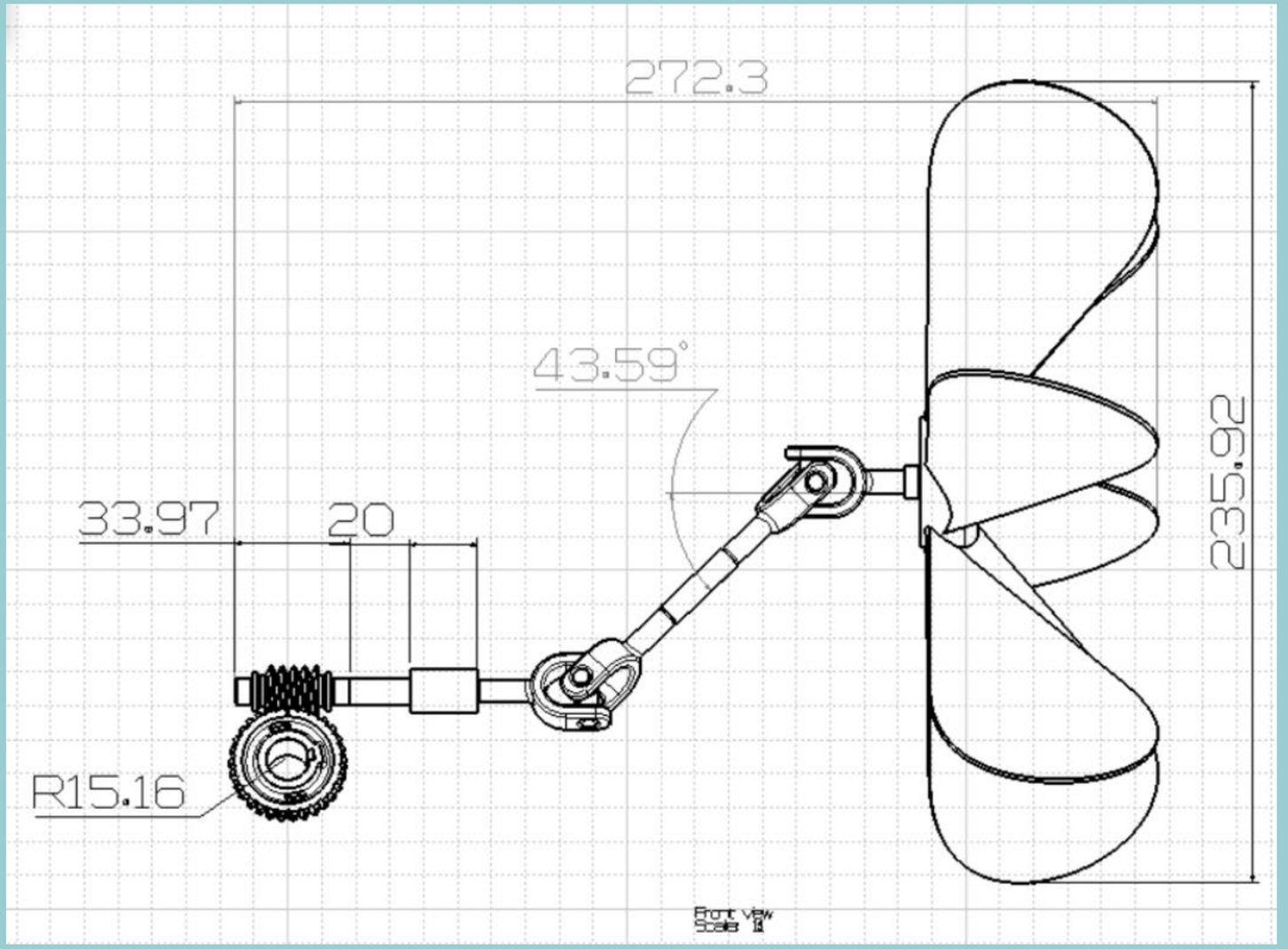
Out Sourcing 출처 : https://grabcad.com/library/worm-and-worm-gear-assembly-1

Propeller & Gear _ Product

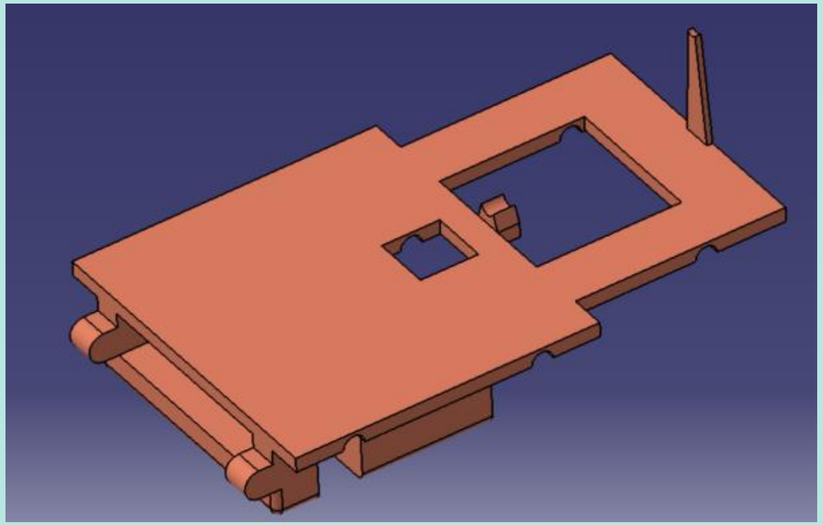


<Assemble & Joint>

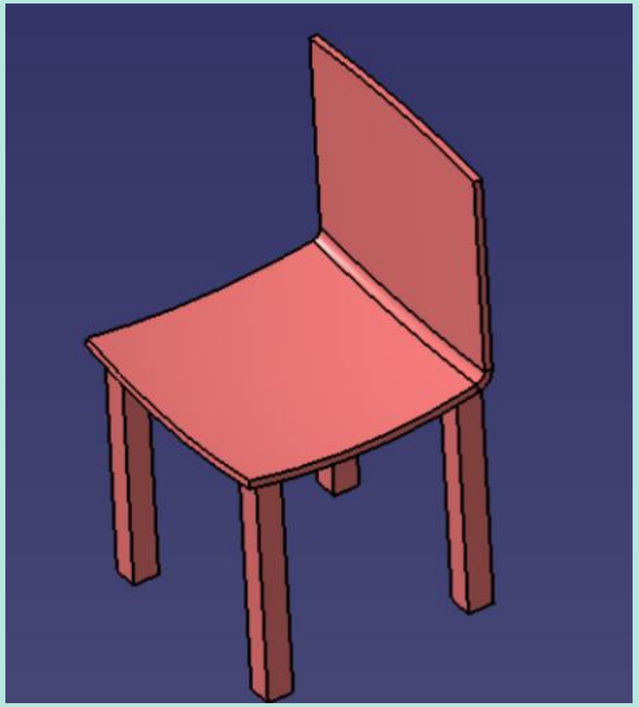
Propeller & Gear _ Draft



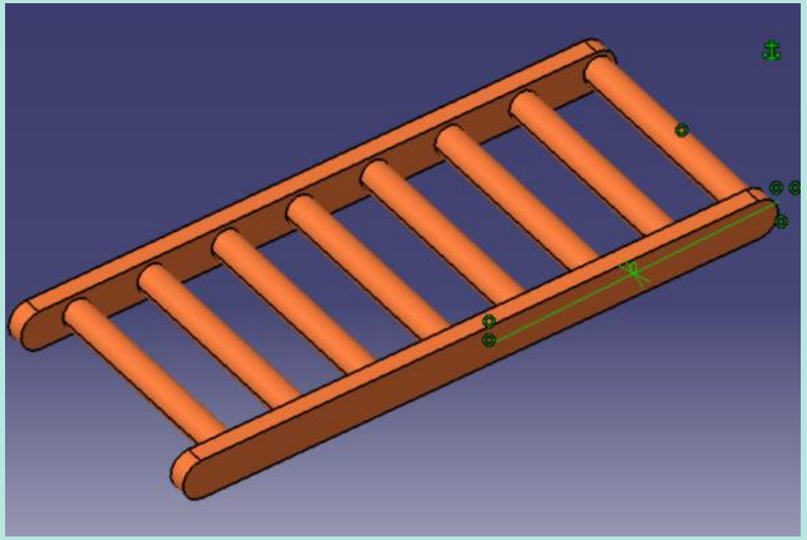
Chair & ladder _ GSD



<Floor>



<chair>

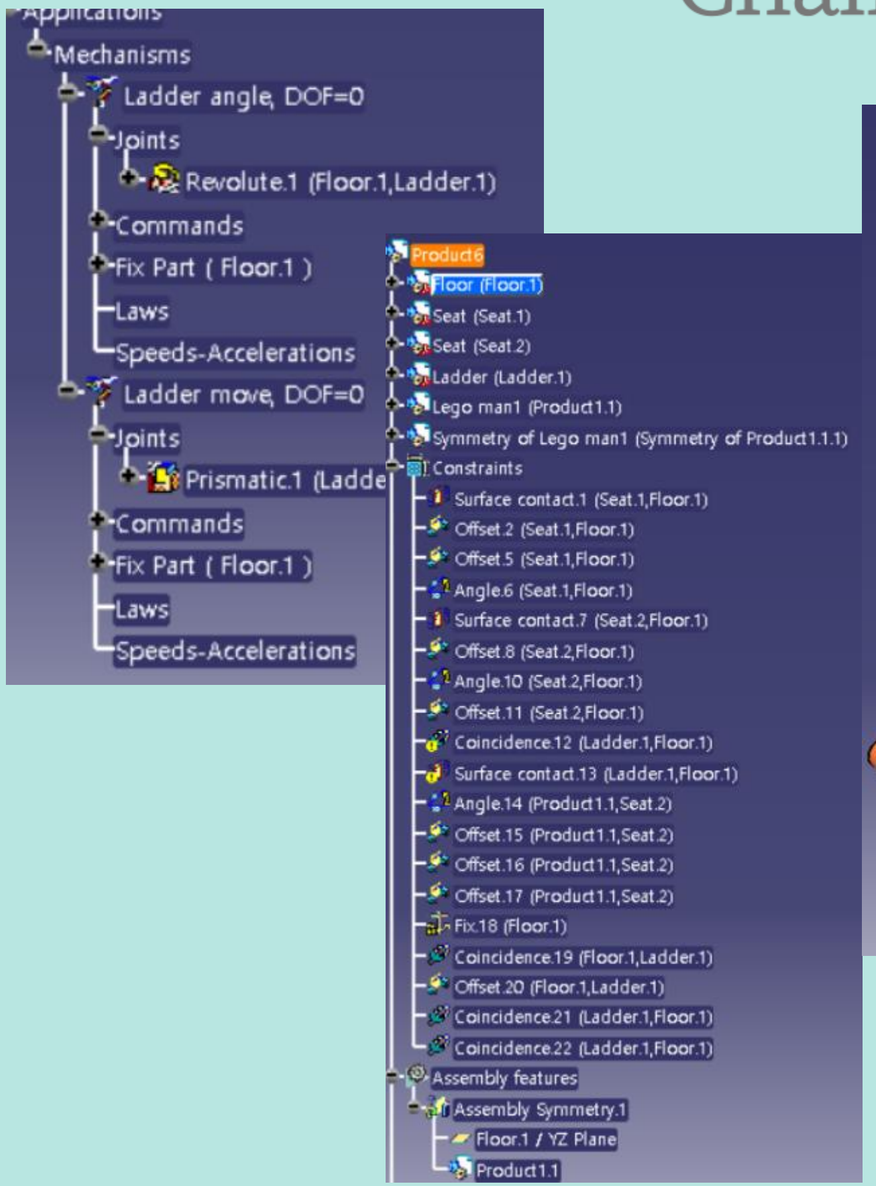


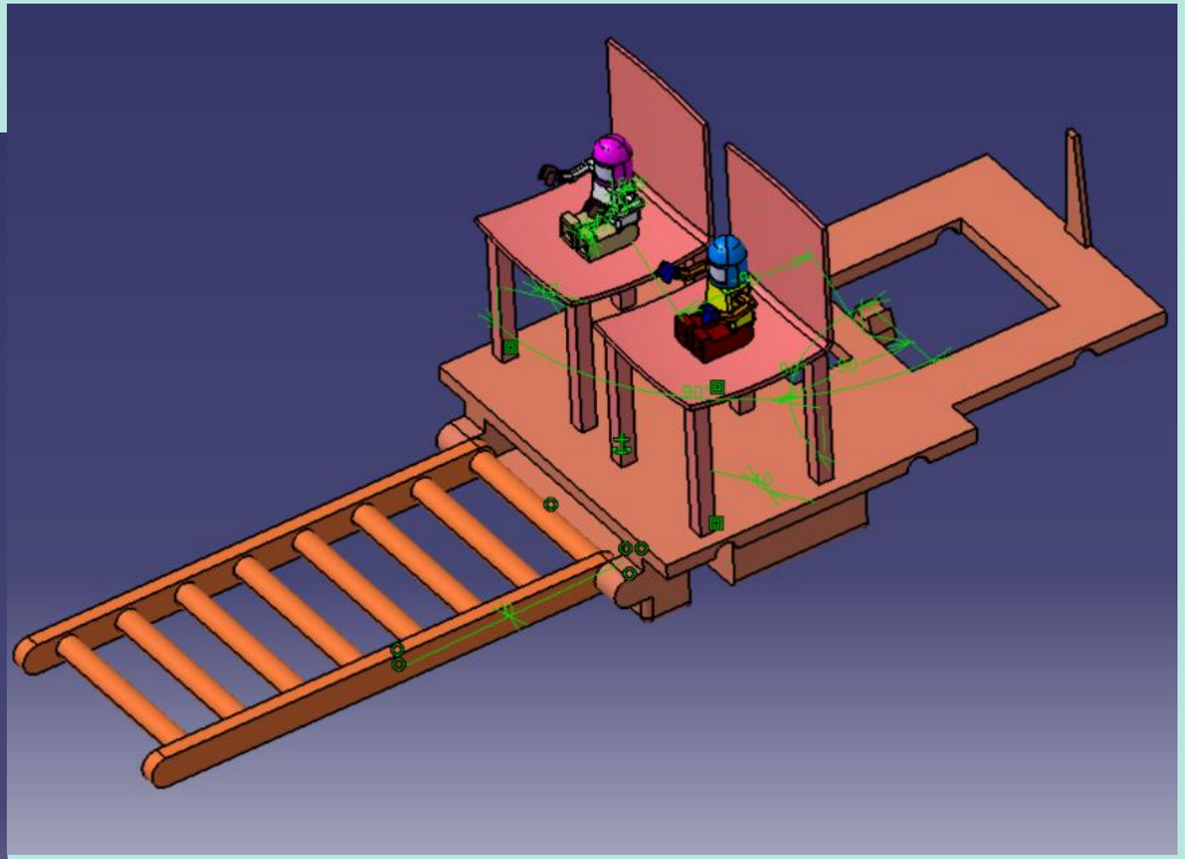
<Ladder>

<Lego Man> - Outsourcing

Out Sourcing 출처 : https://grabcad.com/library/sf-lego-man-1

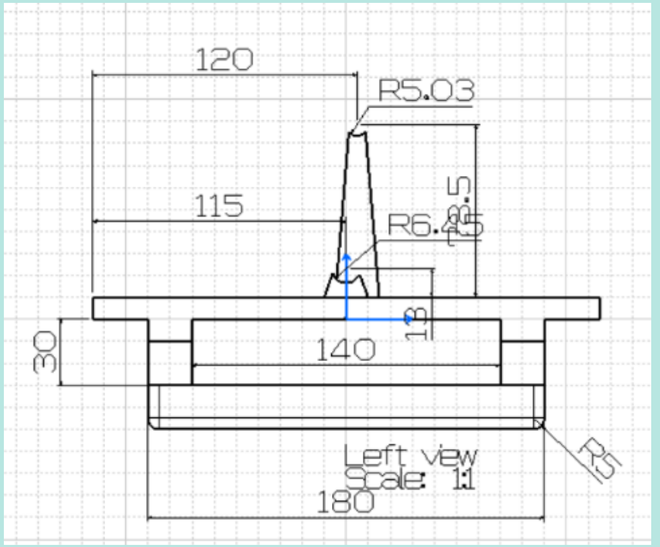
Chair & ladder _ Product

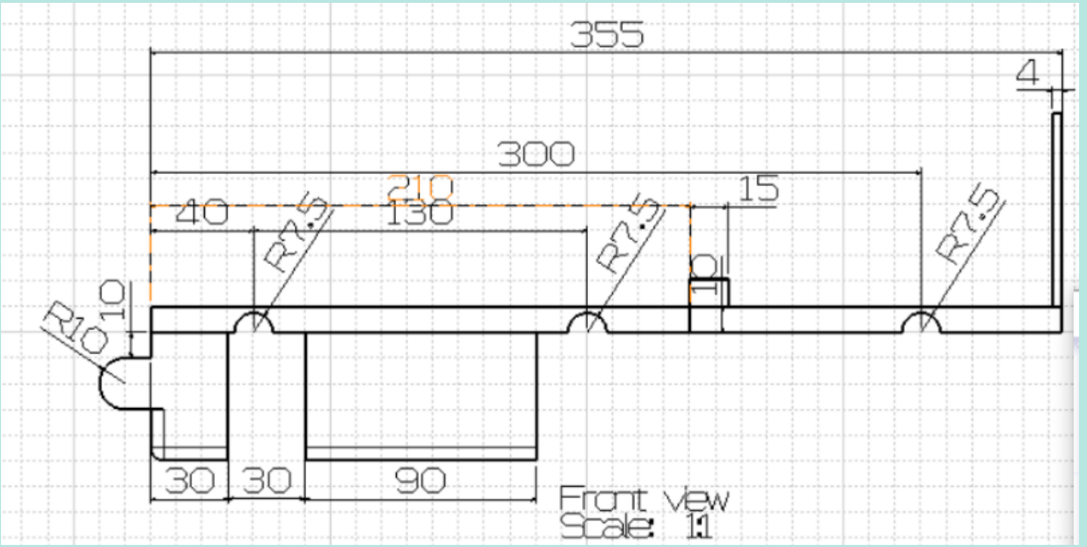




<Assemble & Joint>

Chair & ladder _ Draft





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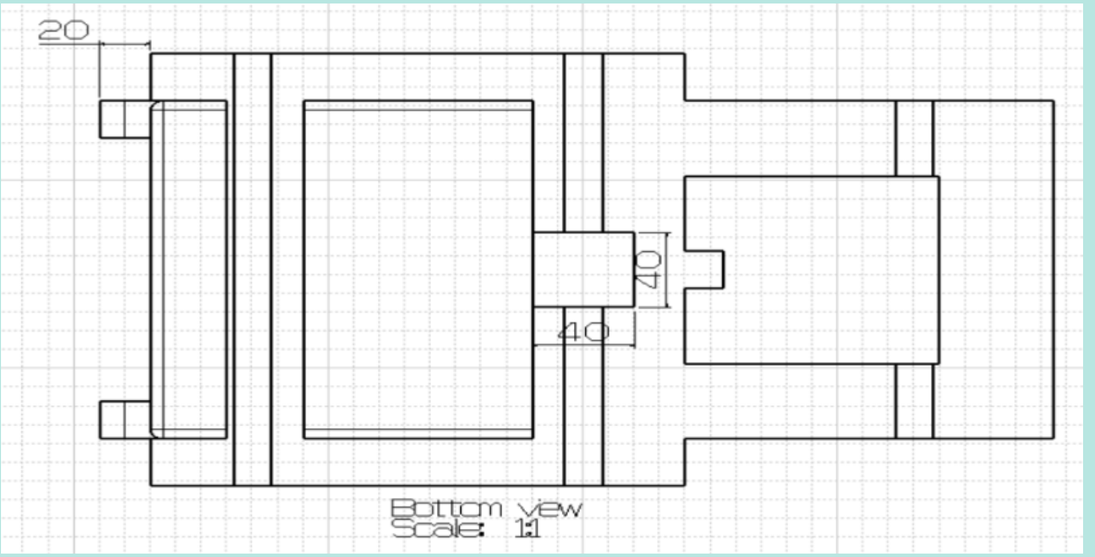
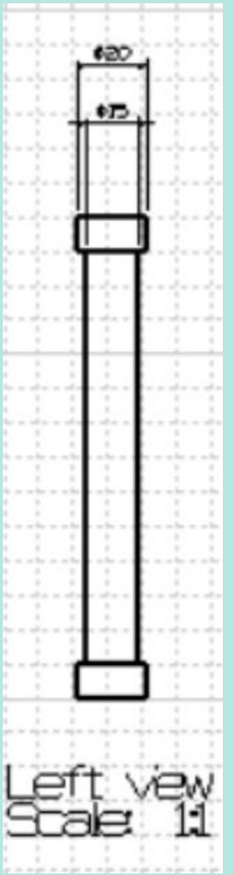
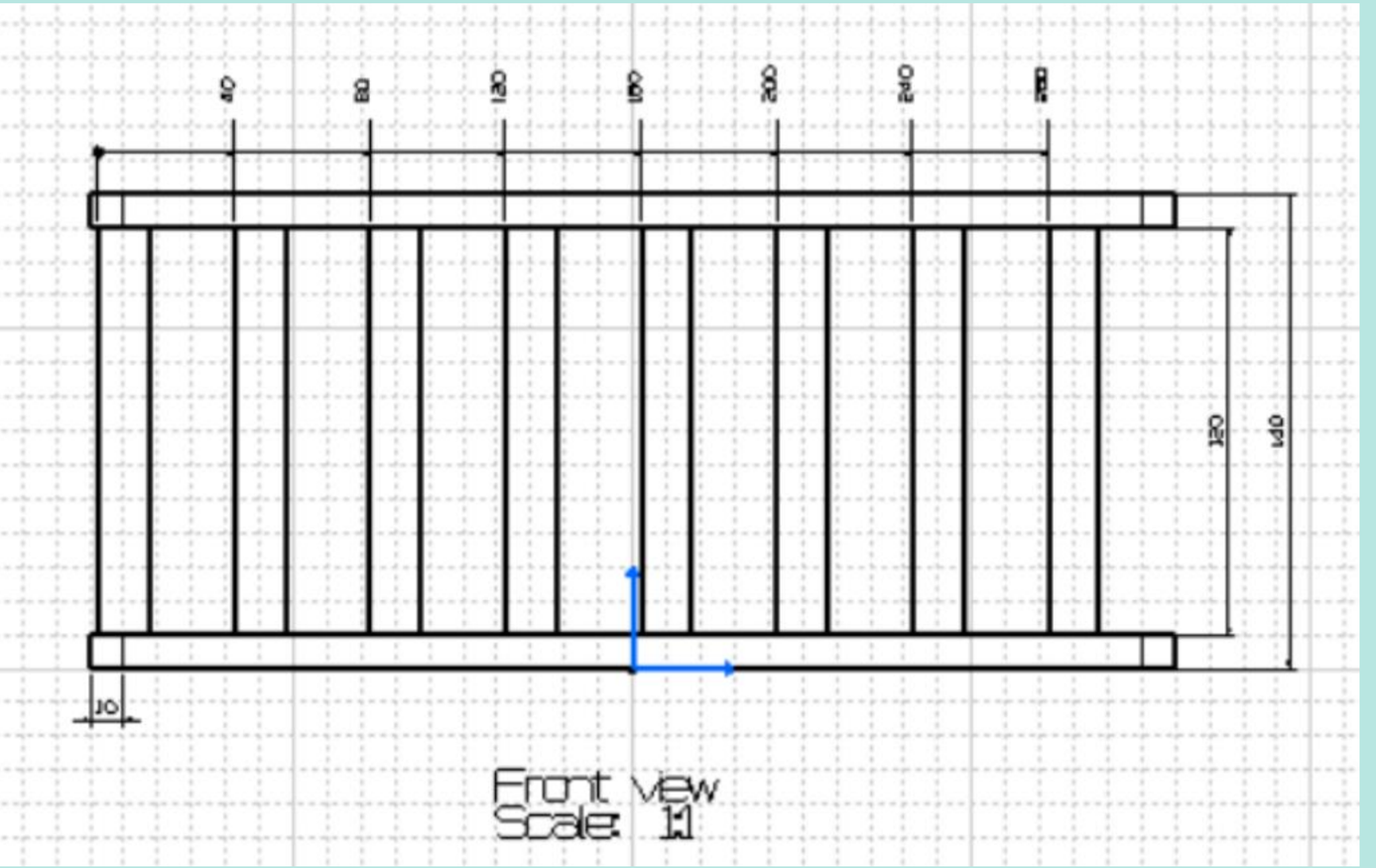


Out Sourcing 출처 : https://grabcad.com/library/sf-lego-man-1

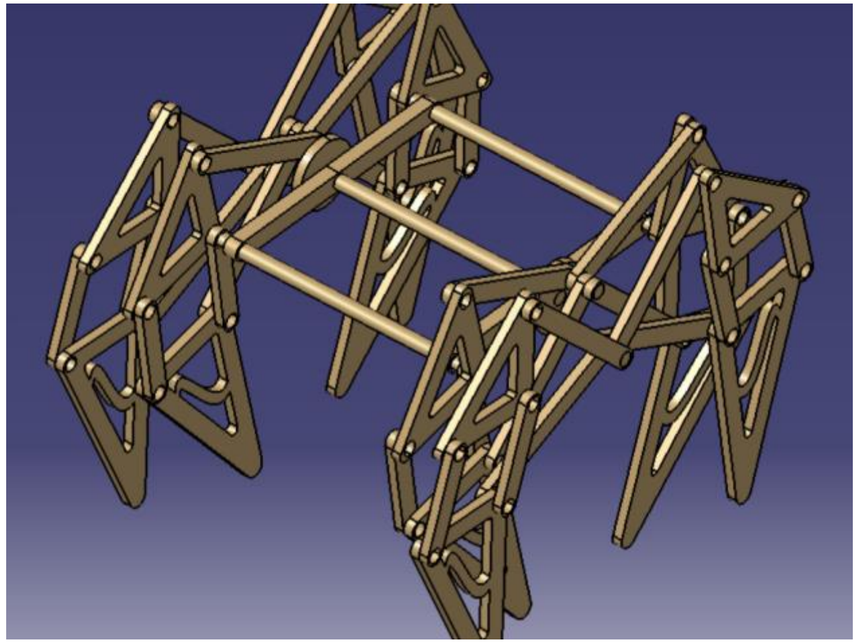
Chair & ladder _ Draft

<Ladder>



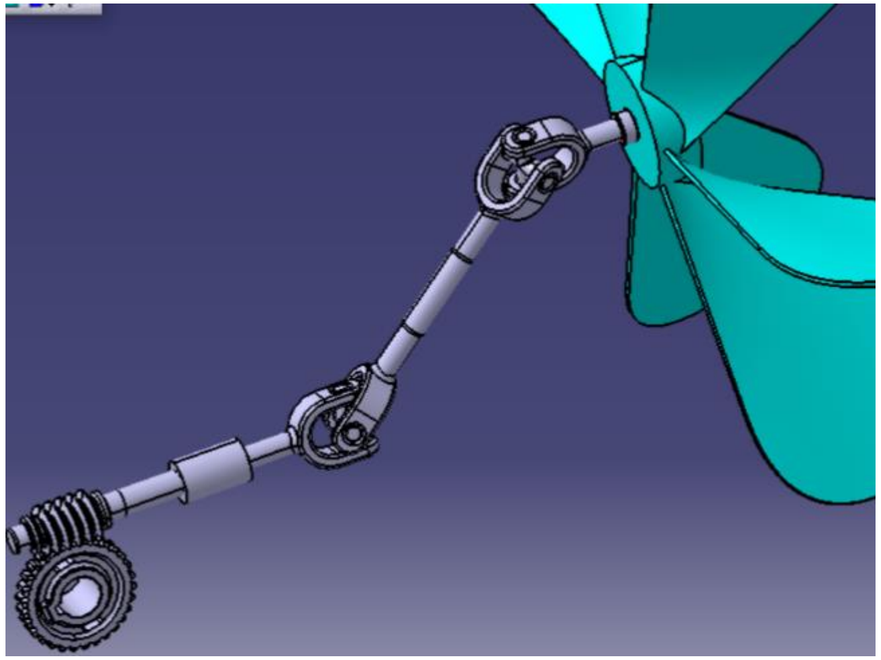


DMU Kinematics



- 중심 원판과 연결된 축을 기준으로 회전
- 다리는 안쪽과 바깥쪽이 180도 위상차

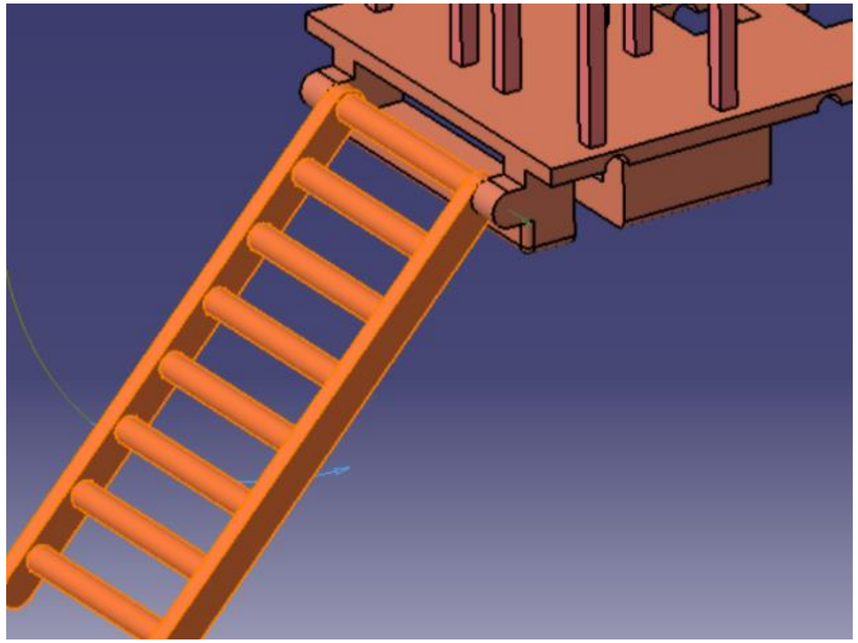
테오 얀센 메커니즘



- 유니버설 조인트와 웜기어 사용
- 가속 운동

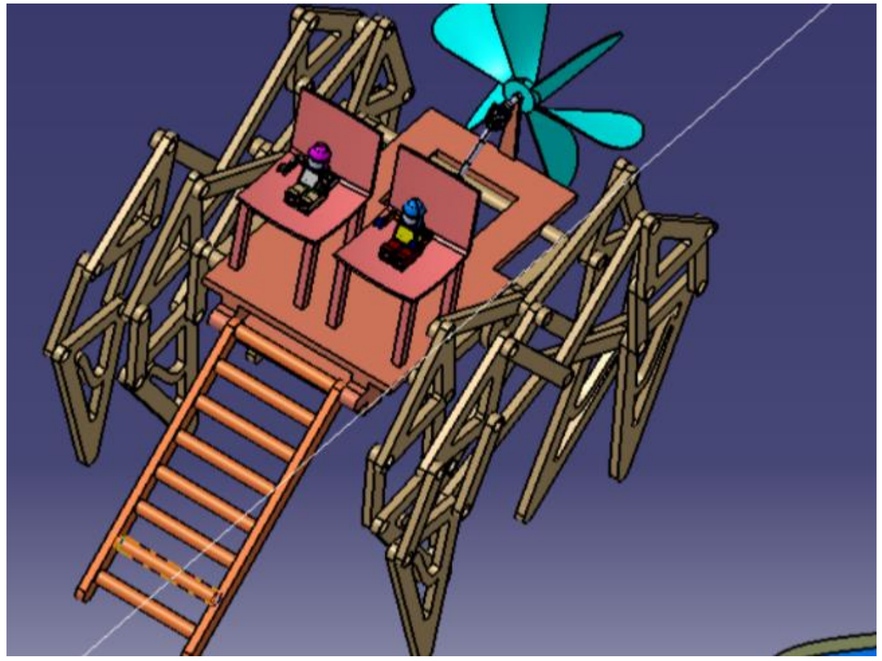
프로펠러의 회전

DMU Kinematics



- 60도 각도로 승객이 탑승할 수 있게 내려옴
- 사용하지 않을때는 의자 밑에 보관

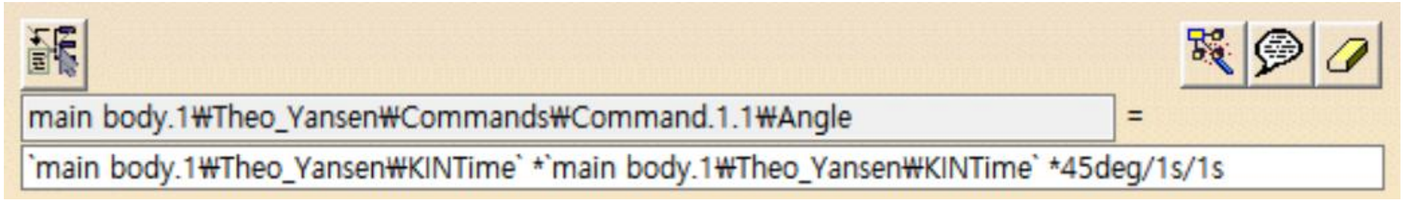
탑승 사다리



- 해변가를 따라 병진운동
- 프로펠러와 함께 가속운동

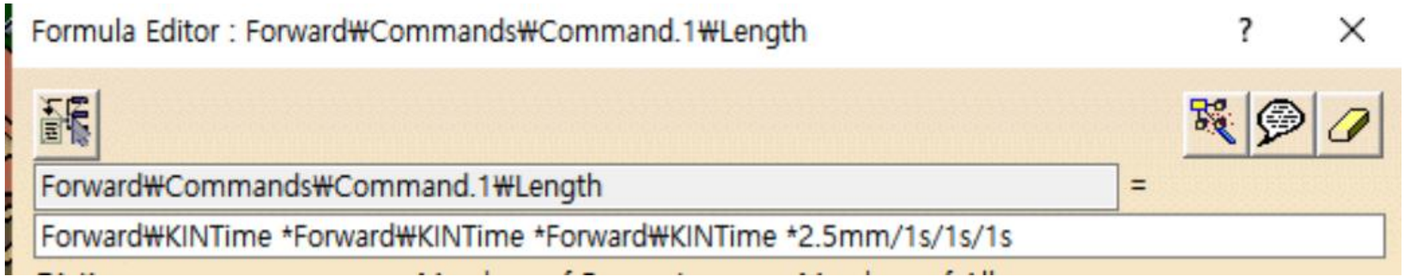
병진 운동

가속 운동 함수



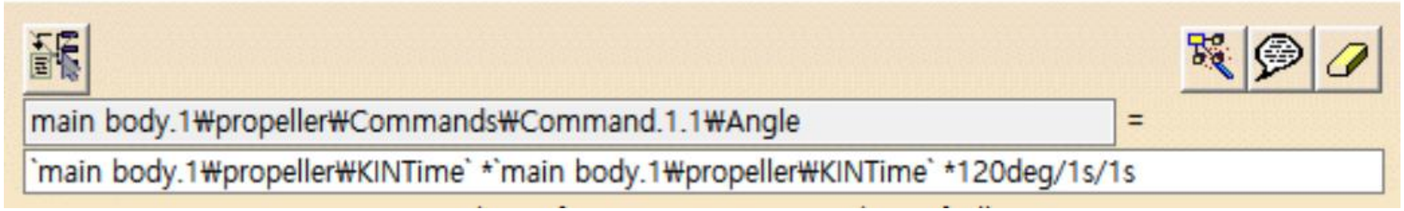
Theo Yansen's mechanism

$45\ \mathrm{deg}/s^2$



Main Body

$2.5\ mm/s^3$



Propeller

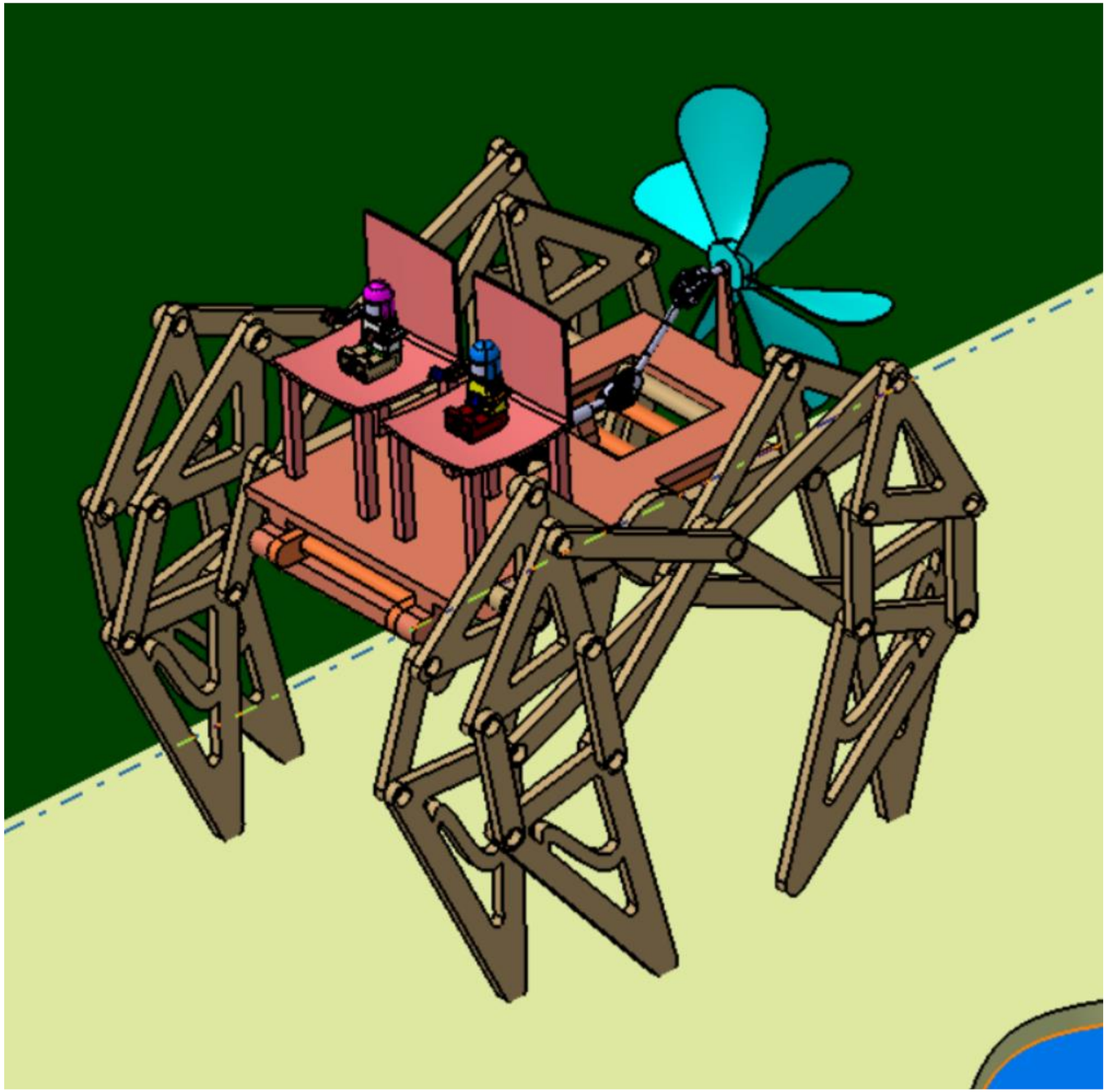
$120\ deg/s^2$

03

Simulation

최종 Assemble, 영상

최종 Assemble Model



영상

https://youtu.be/61Uyy8Ki6wE

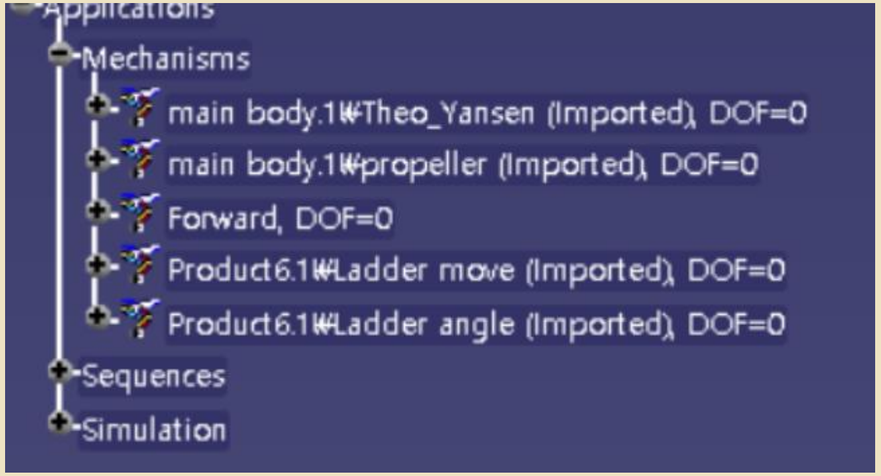
04

마무리

어려웠던 점, Q&A

어려웠던 점

01 많은 양의 Joint로 인한 DOF 계산의 어려움



69개의 part 와 5개의 mechanism

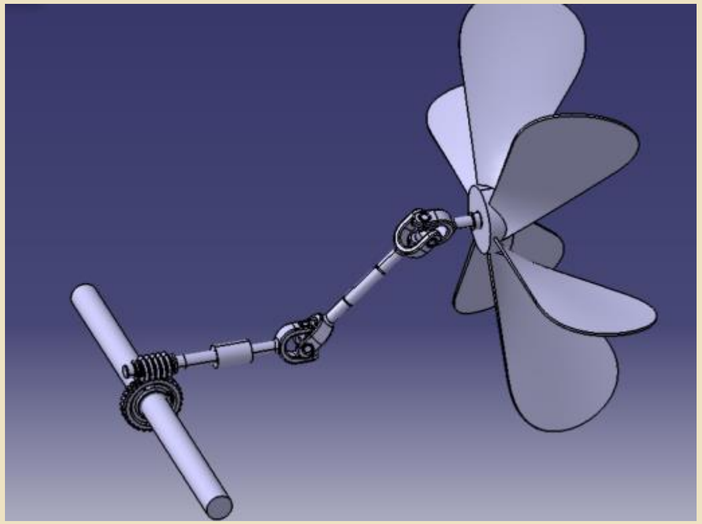
어려웠던 점

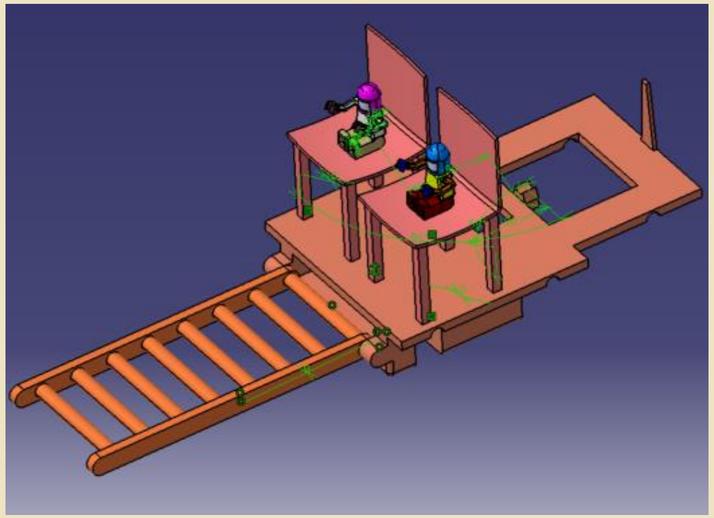
98개의 joint

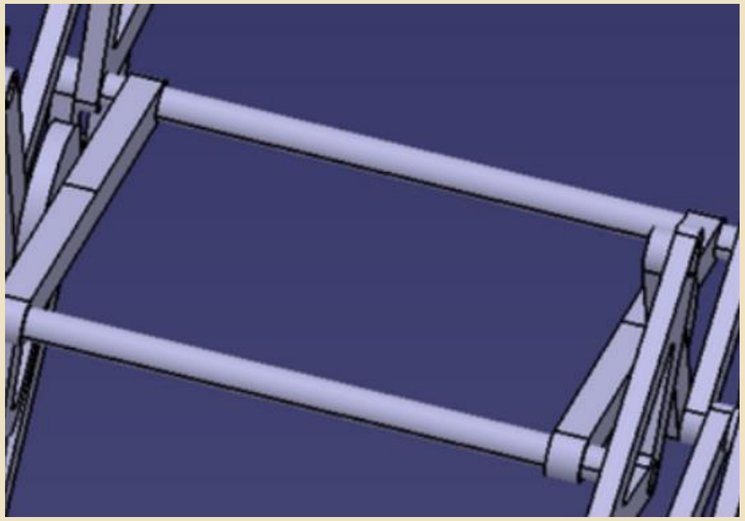
-> 중복으로 Joint를 부여하지 않으면서 DOF=0으로 만들기 위해 많은 노력이 필요했다.

어려웠던 점

02 Part의 치수를 직접 부여한 부분이 많아 다른 Part와 균형을 맞추는데 어려움이 있었음.



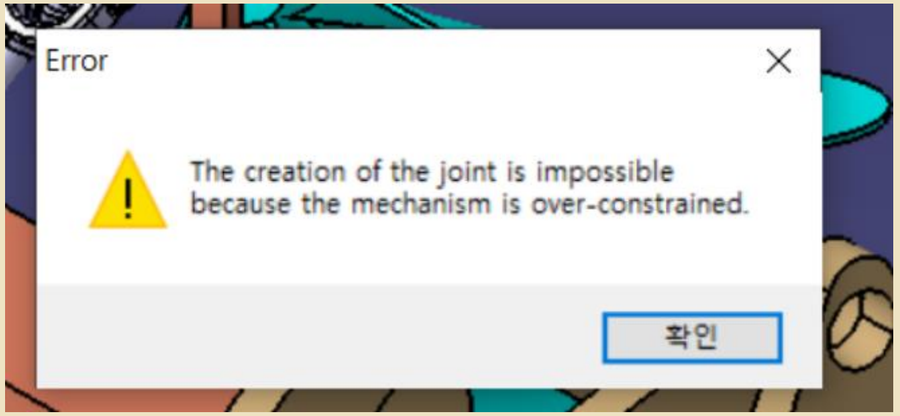


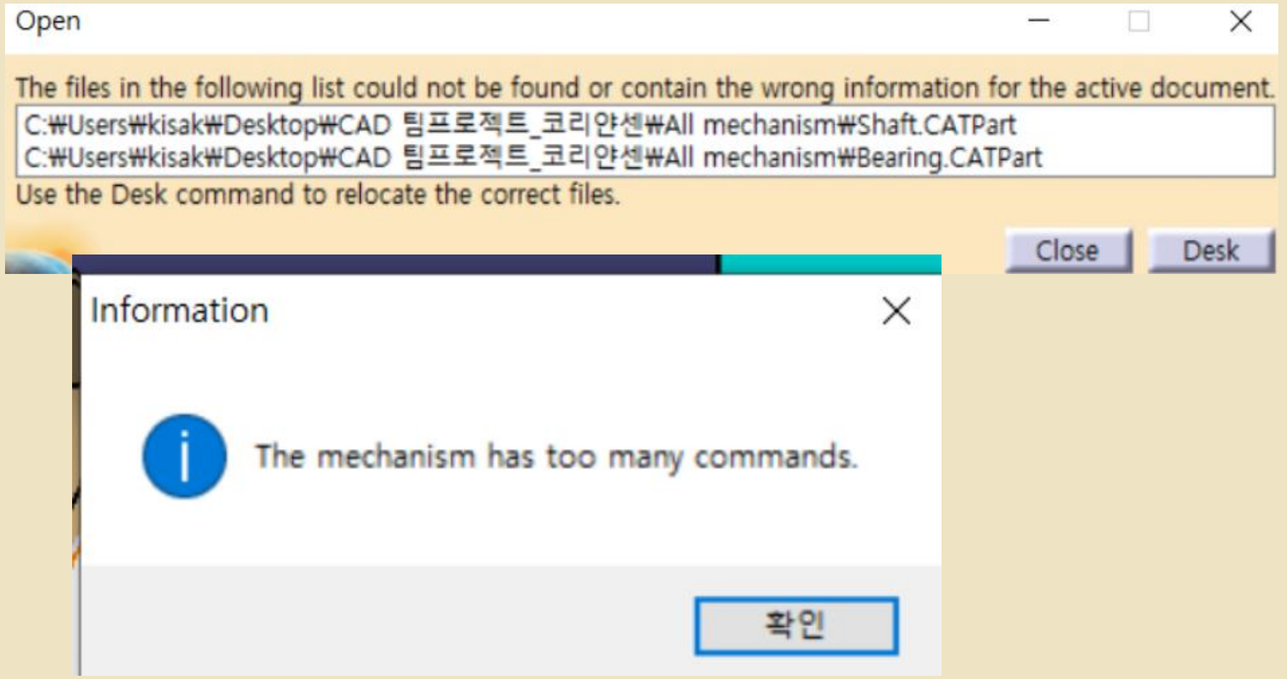


-> 얀센 메커니즘의 다리 부분을 제외한 몸통의 크기, 프로펠러 메커니즘, 의자 및 사다리 부분은 모두 새롭게 치수를 부여해 모델링한 부분들이다.

어려웠던 점

03 Assemble 할 때 각각의 Product와 Mechanism의 처리 문제

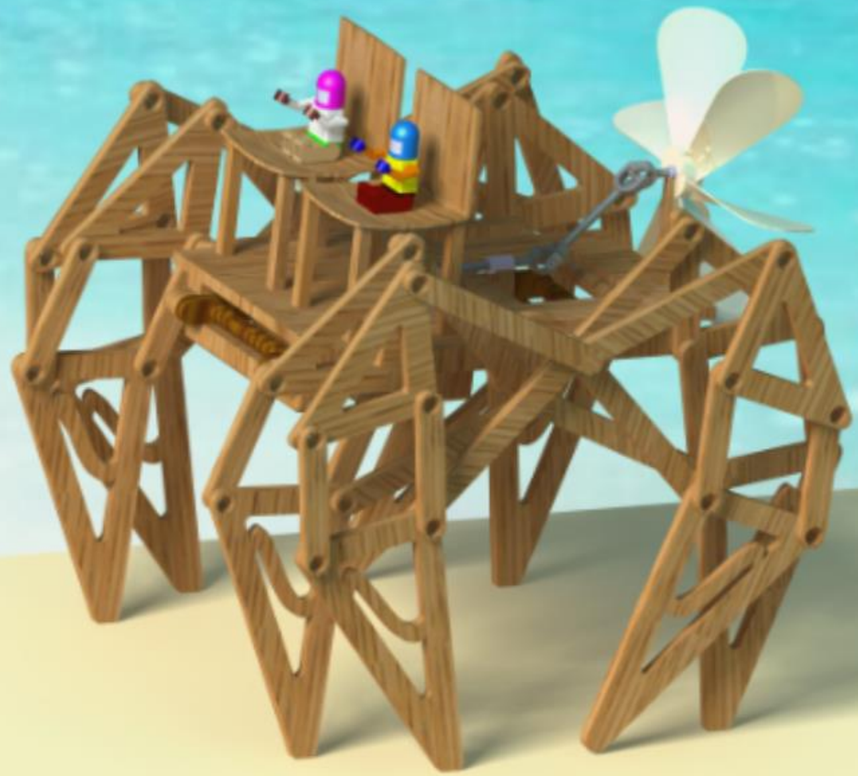




-> Over Constraint, Too many commands, 경로 재설정 문제 등 많은 오류가 발생했고,

이를 해결하기 위해 같은 작업을 여러번 반복하거나 새로 수행하게 되는 일이 많이 있었다.

Q & A




Thank you
; 감사합니다