

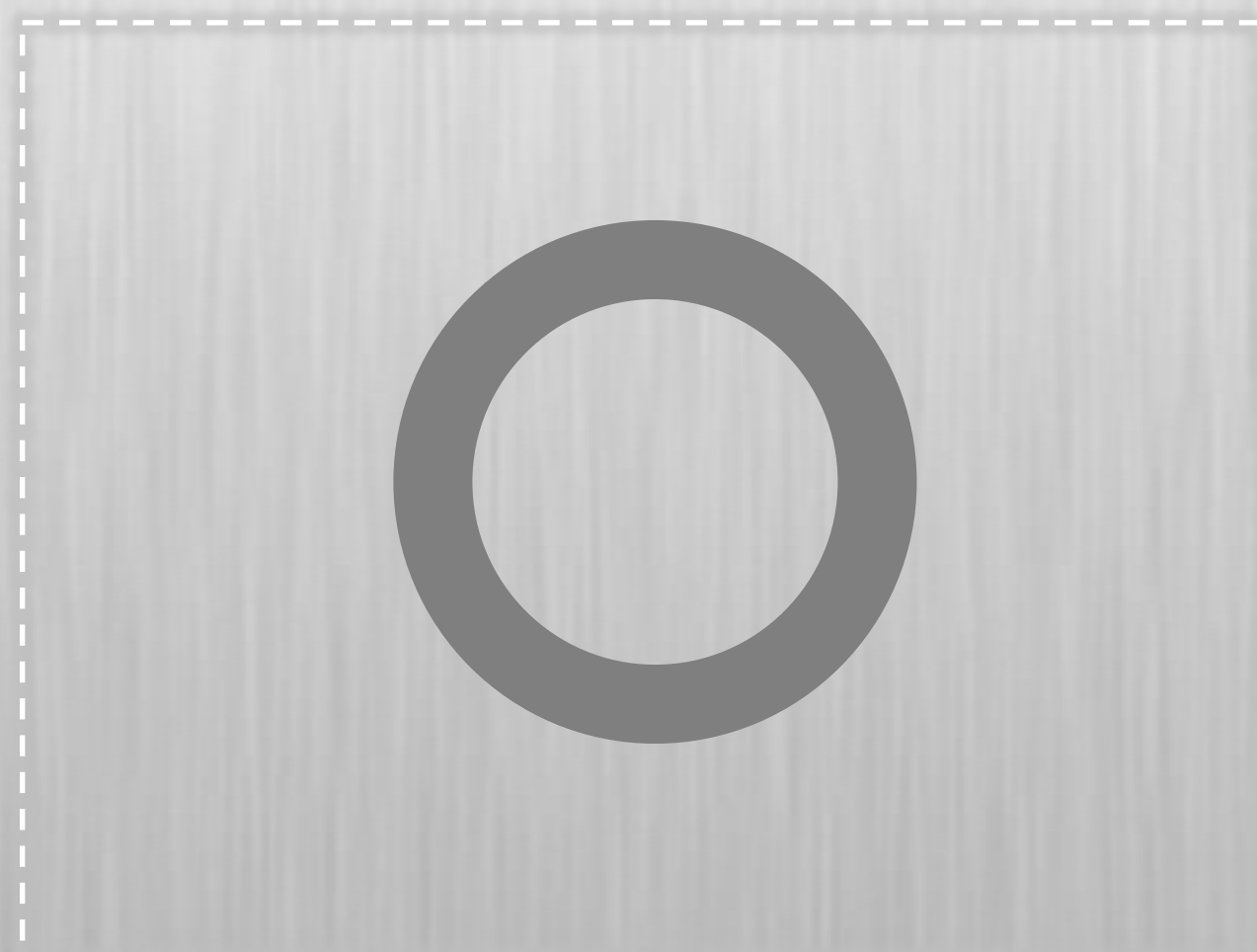
Design Optimization.

Bicycle frame

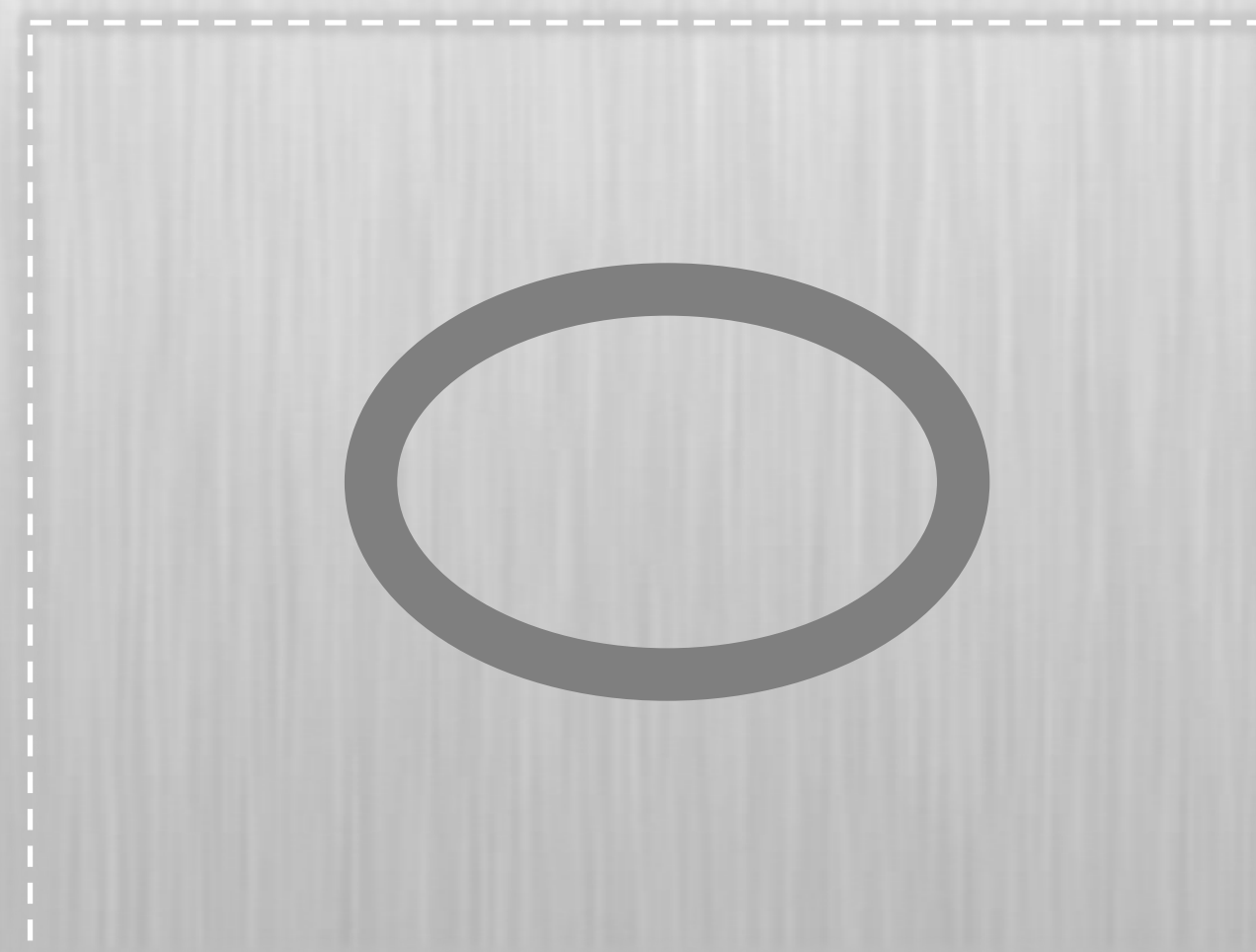
Dime chaser
:이신성, 김승연

ADJUSTMENT

Shape



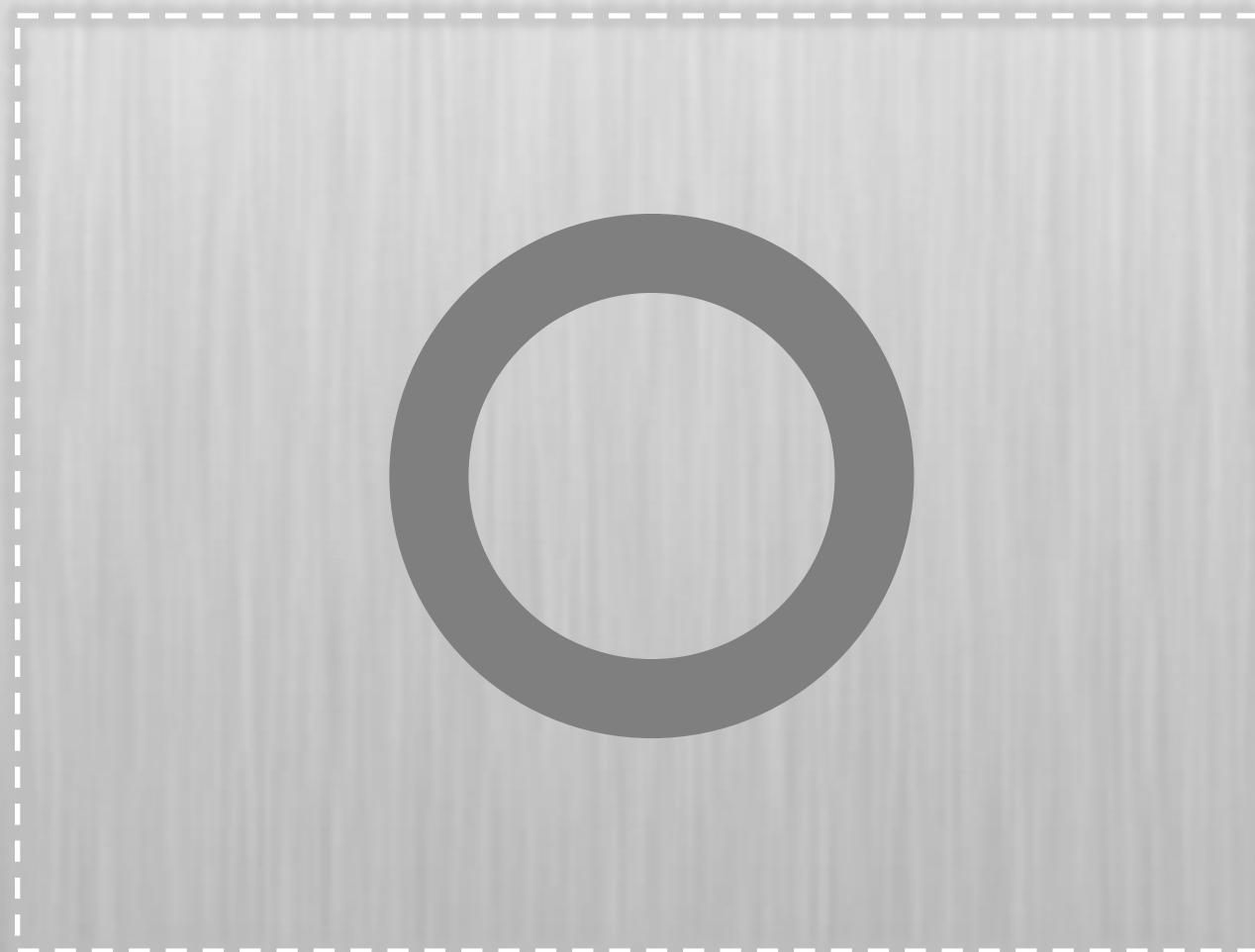
Before – Circle



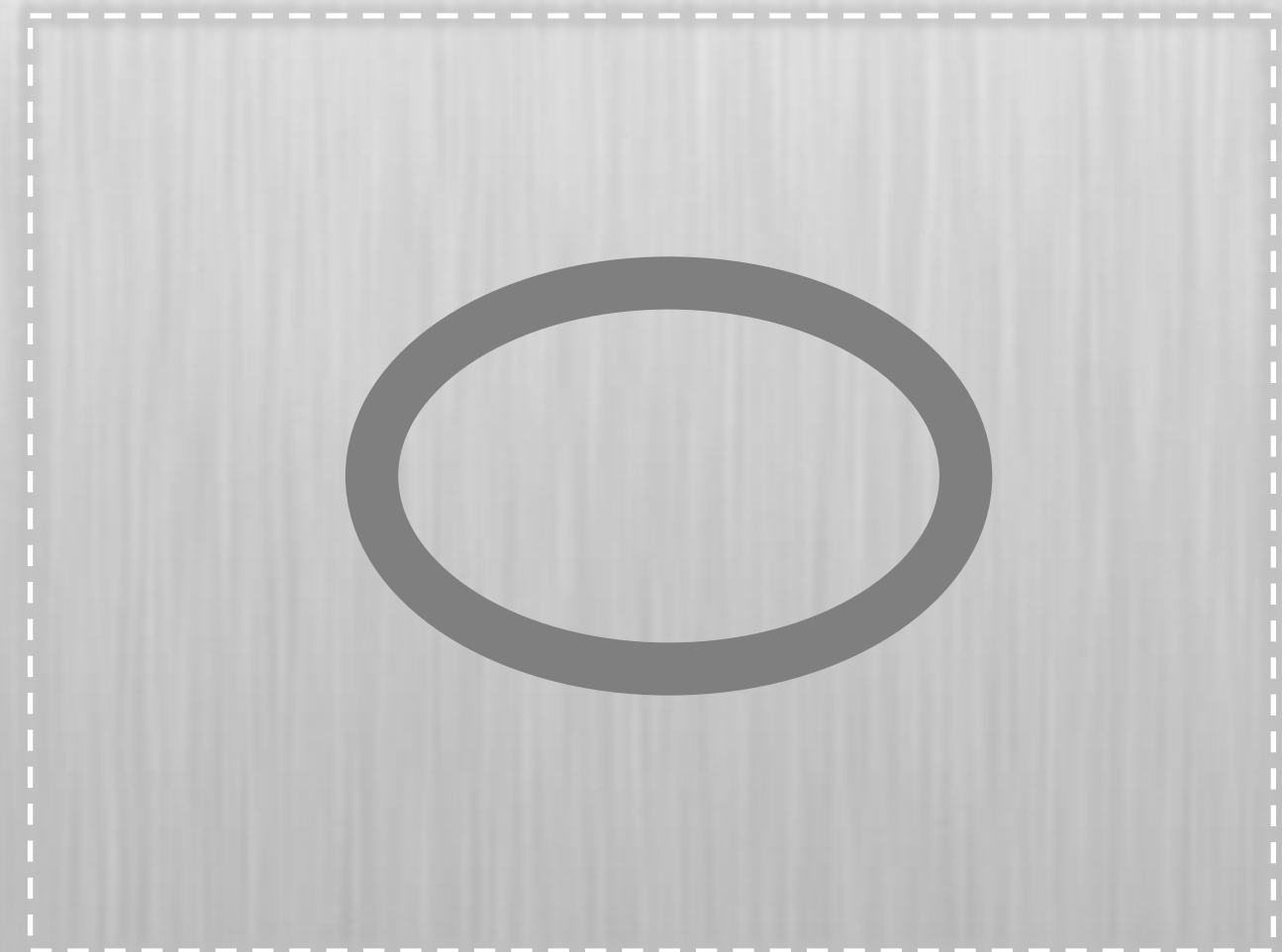
After – Ellipse

ADJUSTMENT

Variation



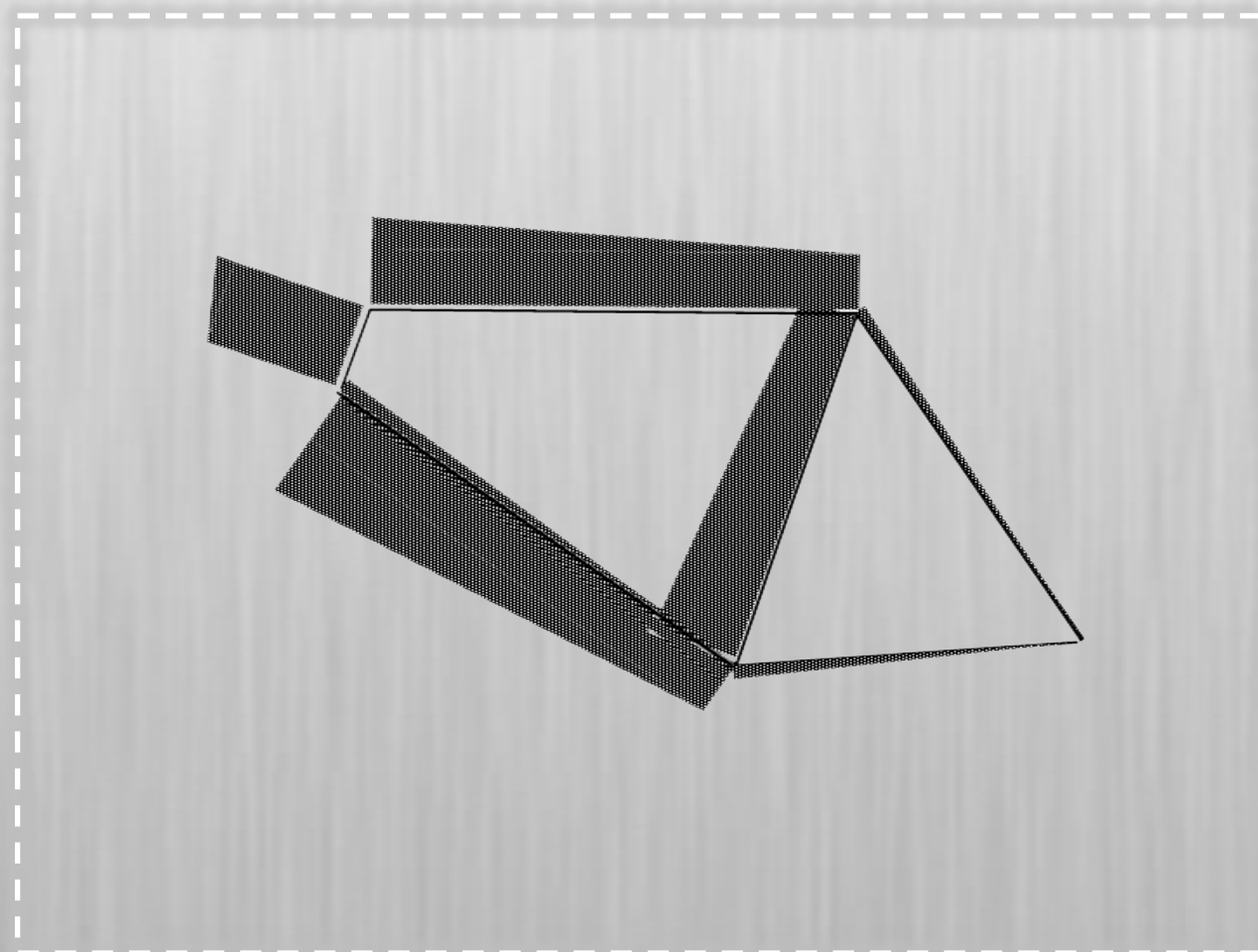
Before – R_o , R_i



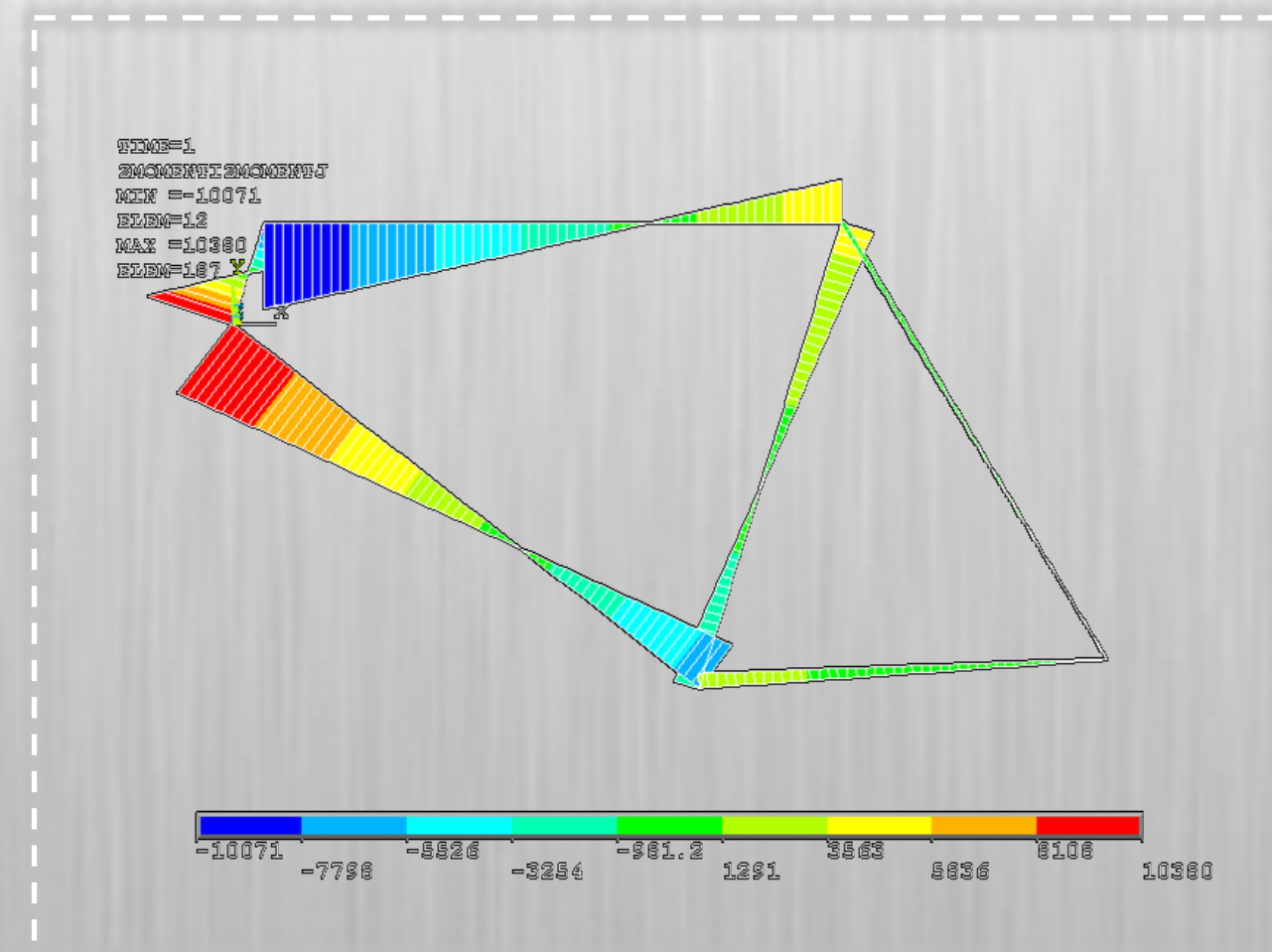
After – A , B , t

ADJUSTMENT

Moment diagram



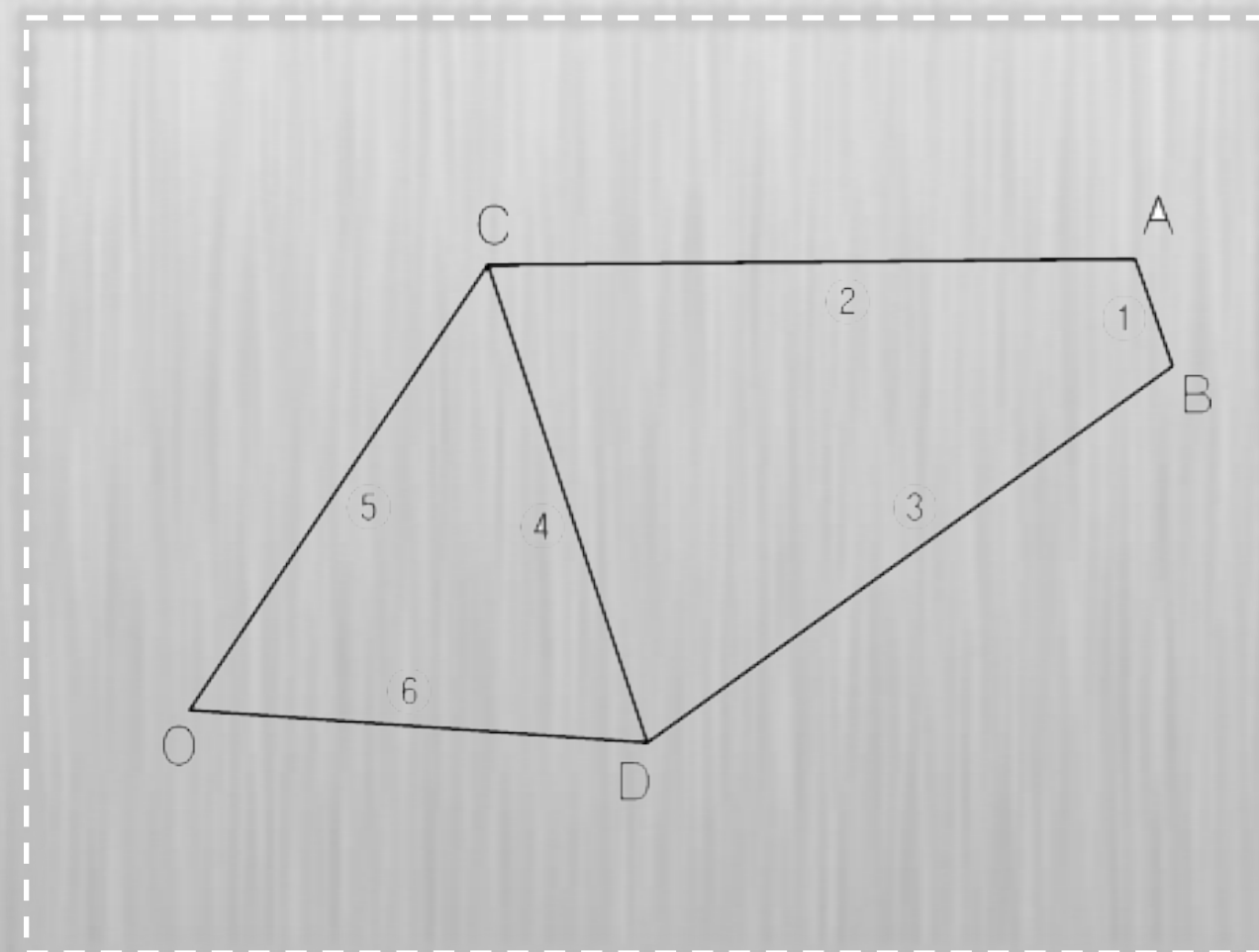
Before – Assumption



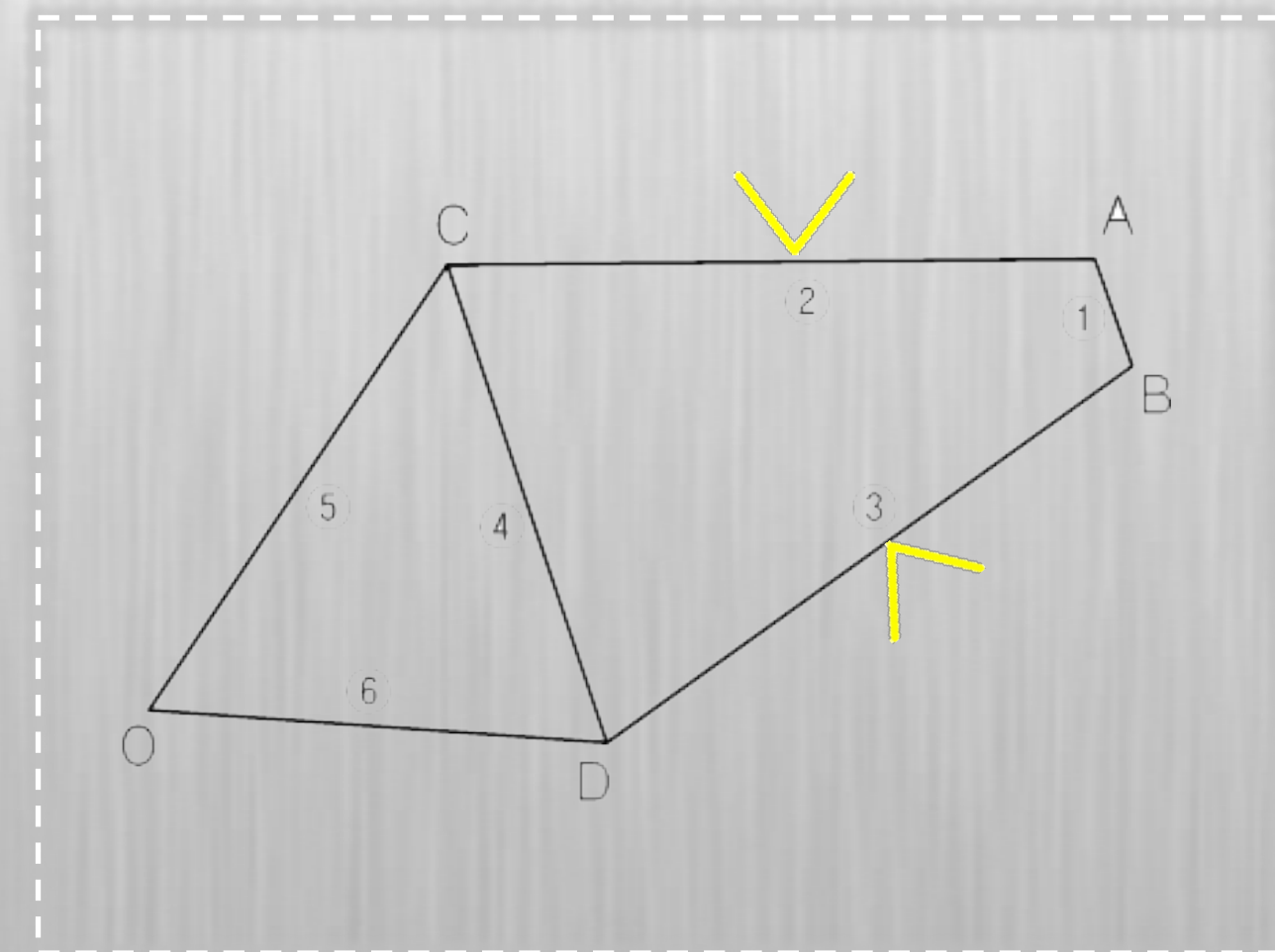
After – Numerical approach
(Ansys)

ADJUSTMENT

Partition



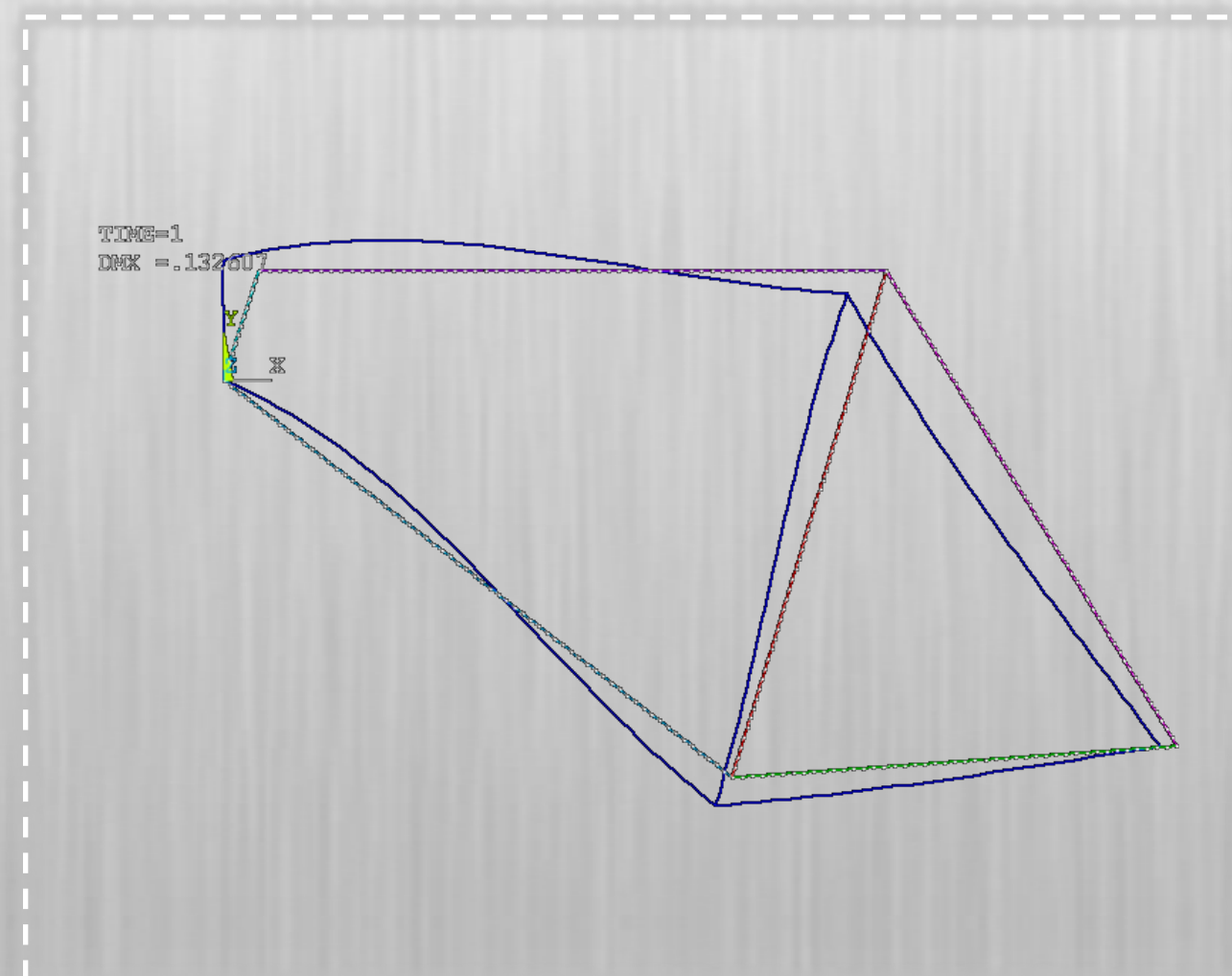
Before – 6 Members



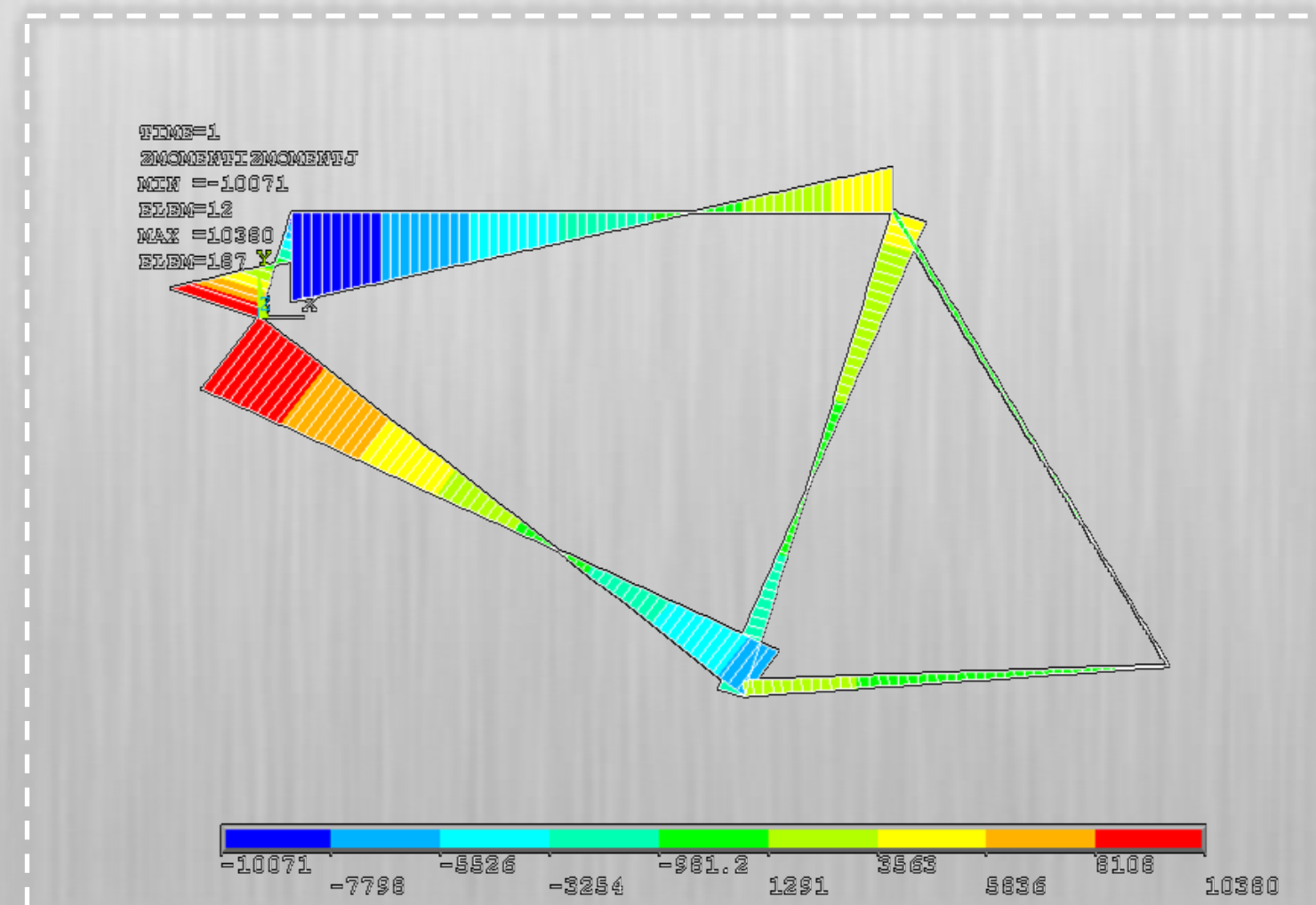
After – 8 Member

ASSUMPTION

Basic Constraint



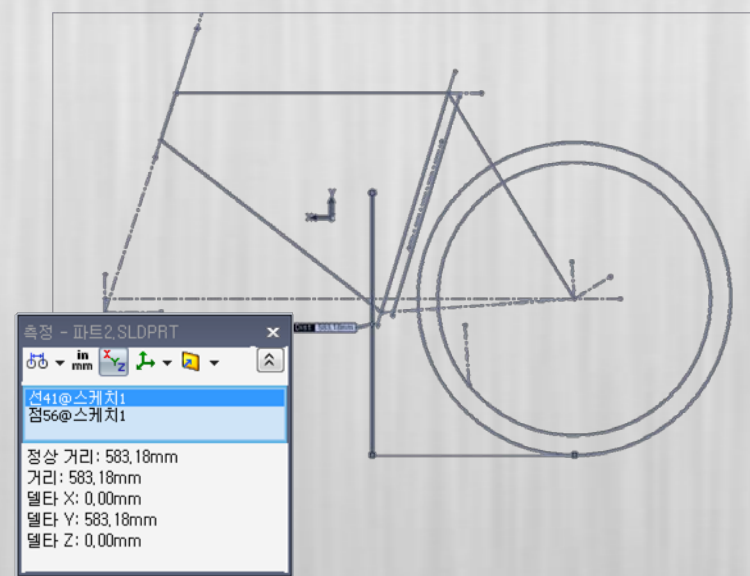
Displacement



Z-direction Moment

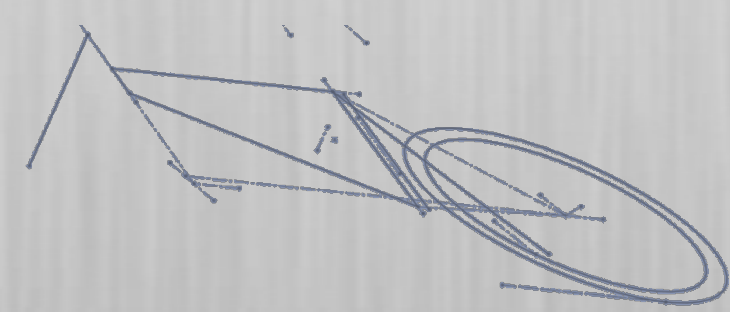
ASSUMPTION

Side slip



Center of Area:

$$\bar{G} = \frac{G_1 A_1 + G_2 A_2 + G_3 A_3}{A_1 + A_2 + A_3}$$



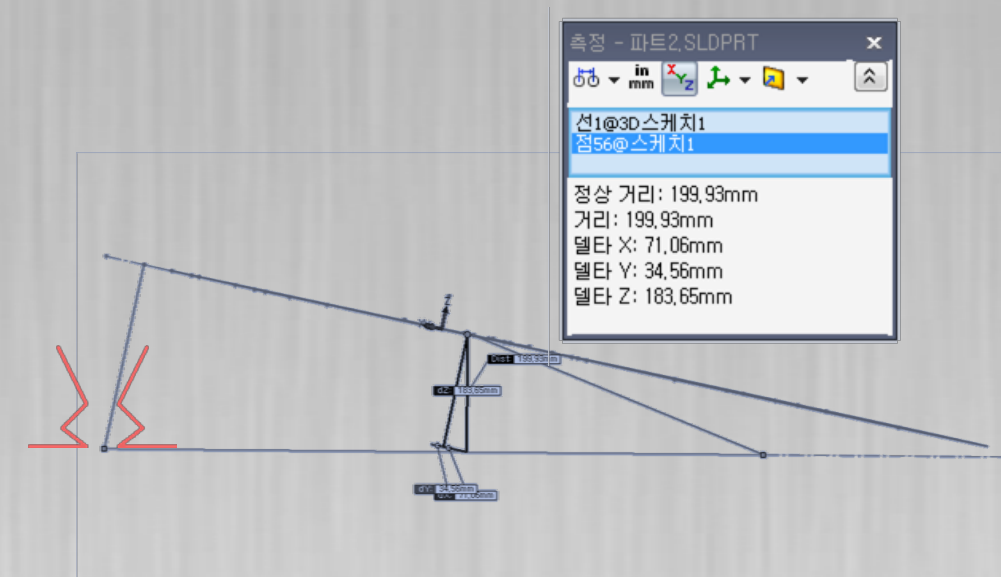
Energy method:

$$\frac{1}{2} m (\Delta v)^2 = m g (\Delta h)$$

$$v_2 = \sqrt{2 \cdot 9.8 \cdot (0.3833)} \\ = 2.7984 \text{ m / s}$$

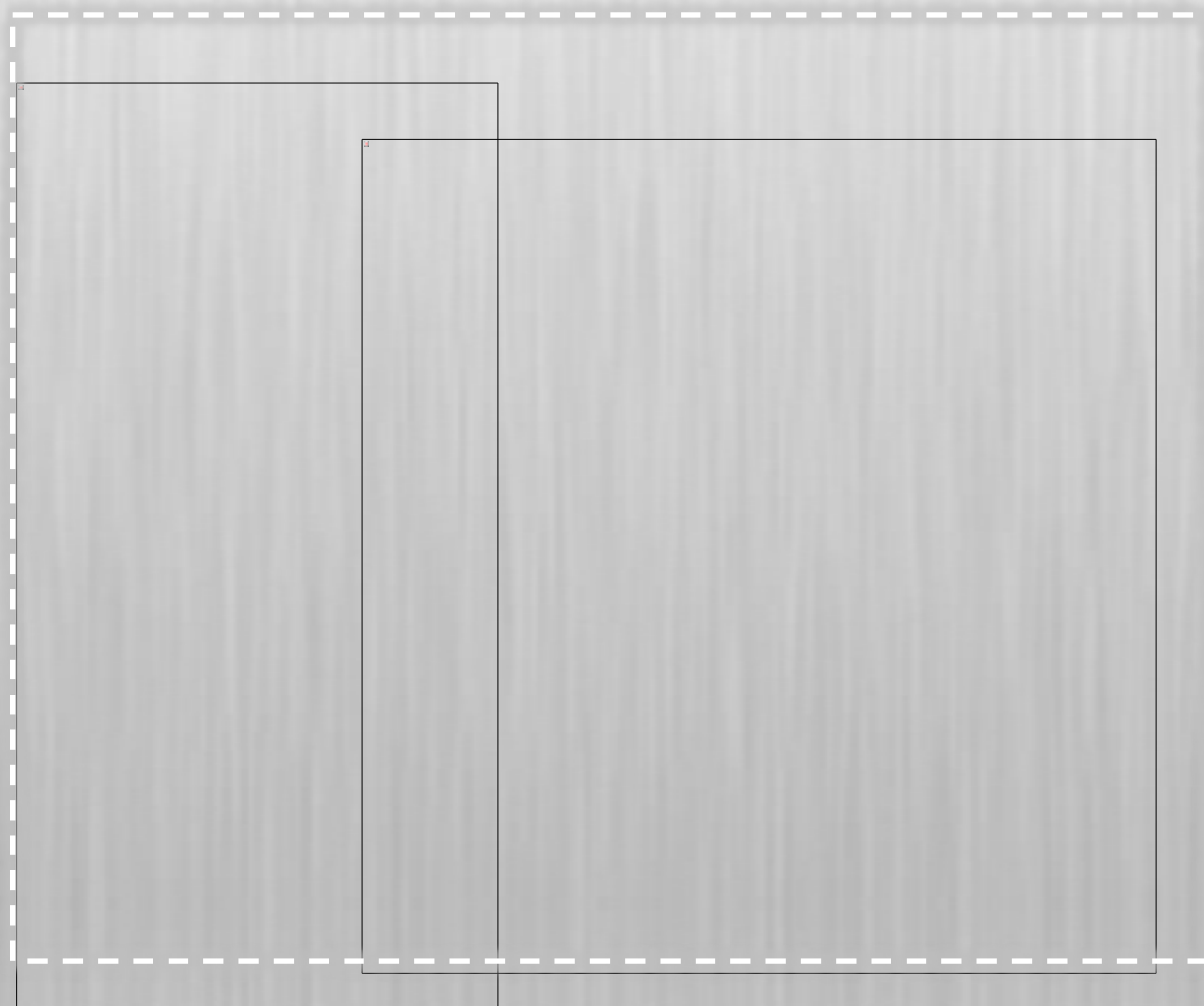
Momentum:

$$F = \frac{mv}{\Delta t} \\ = \frac{13.992}{0.5} \\ \approx 30 \text{ N}$$



ASSUMPTION

Side slip



Displacement



Y-direction Moment



12"



16"



20"



24"



26"

TIRE	
SIZE	PART # B-C
12"	2.215"
16"	1.75"
16"	1.75"
20"	1.75"
20"	1.75"
20"	2.125"
20"	2.125"
24"	1.75"
26"	1.75"
26"	2.125"





RIM SIZE A-B	
12"	4.5"
16"	6.25"
20"	8.25"
24"	10.25"
26"	11.25"

Wheels & Tires

TIRE SIZE B-C
12" X 2.125"
16" X 1.75"

How To Measure
Bicycle Wheels & Tires



REALIZATION





QUESTION?