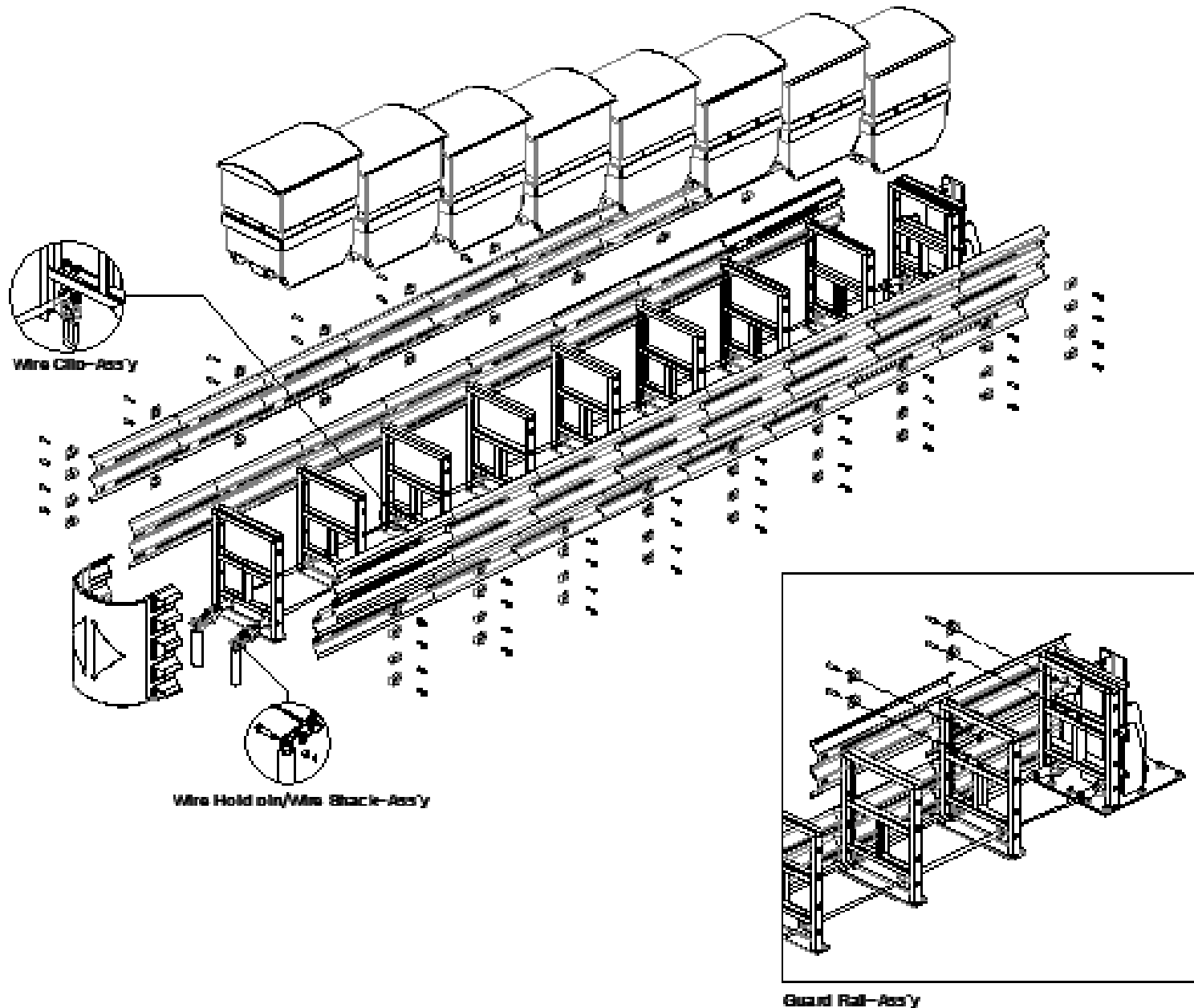


# Installation and Assemble Manual

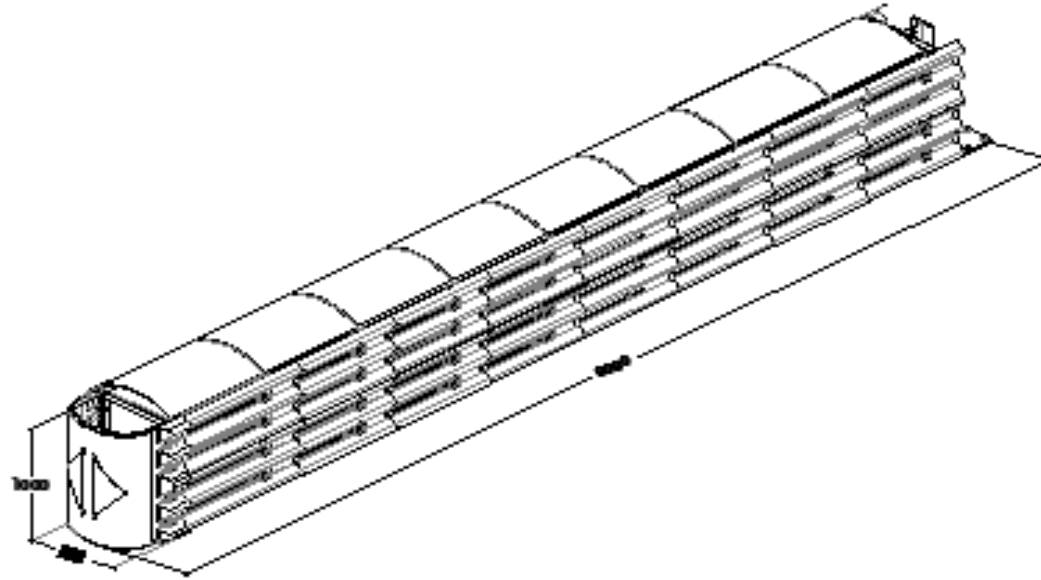
## SHIN DO Crash Cushion Step By Step Instruction For parallel



Crash Cushion System

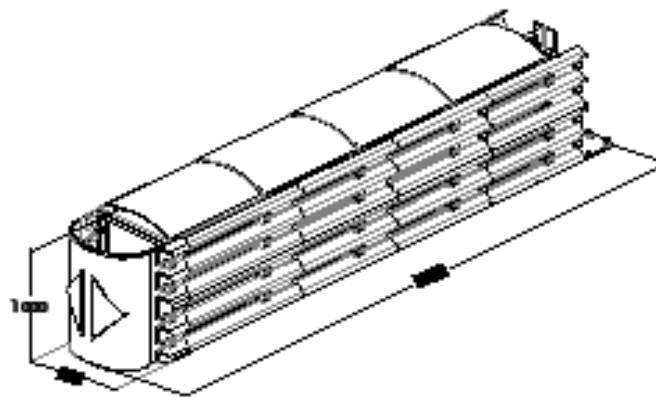


Model Name



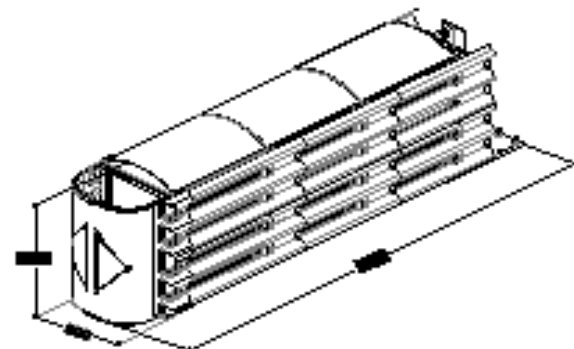
CCS-110, 100Km/h

Model : SD-CCS110-P2  
SD-CCS100-P2



CCS-80Km/h

Model : SD-CCS80-P2



CCS-50Km/h

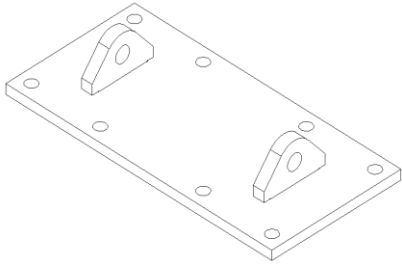
Model : SD-CCS50-P2

Crash Cushion System

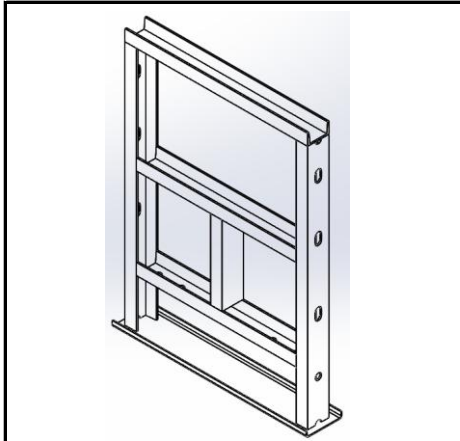
## CCS\_Separate-Type Component List-[wire hold plate\_type]

### \*Component List\_1

Anchor&WireHoldPlate&Asphalt



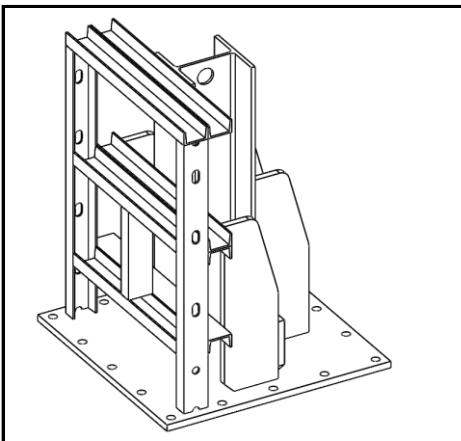
|        |                 |
|--------|-----------------|
| Name   | Wire Hold Plate |
| P/CODE | CSCCE13WP11T    |
| SIZE   | 620x300x20      |
| Weight |                 |



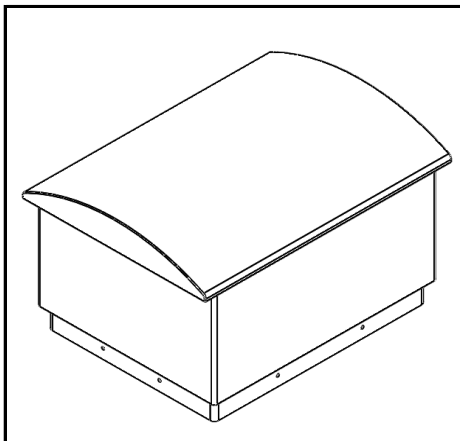
|        |              |
|--------|--------------|
| Name   | Front Frame  |
| P/CODE | CSCCE12FT11L |
| SIZE   | 680x125x910  |
| Weight |              |



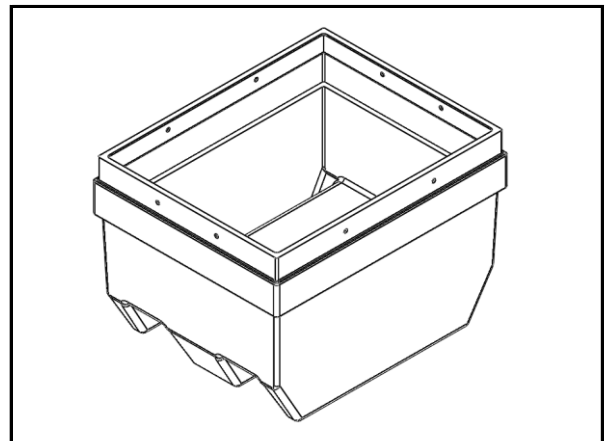
|        |              |
|--------|--------------|
| Name   | Middle Frame |
| P/CODE | CSCCK31FM11L |
| SIZE   | 680x125x910  |
| Weight |              |



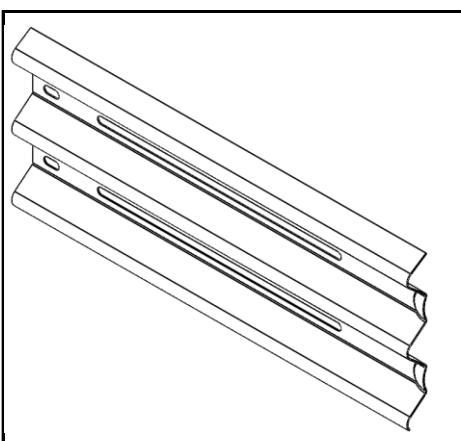
|        |                 |
|--------|-----------------|
| Name   | Back Stop Frame |
| P/CODE | CSCCK31FB11L    |
| SIZE   | 700x700x910     |
| Weight |                 |



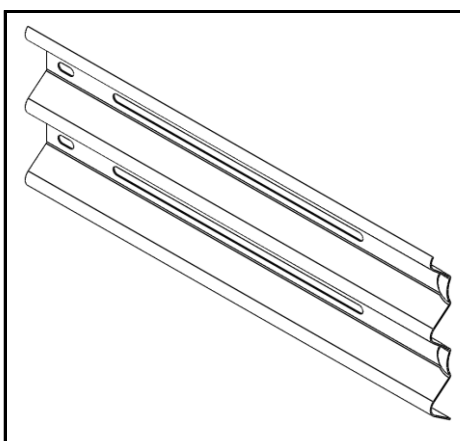
|        |                 |
|--------|-----------------|
| Name   | Middle Tank_Top |
| P/CODE | CSCCE12TM11O    |
| SIZE   | 630x790x523     |
| Weight |                 |



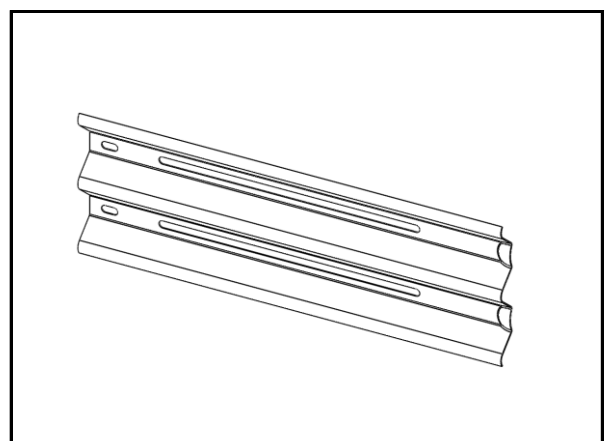
|        |                    |
|--------|--------------------|
| Name   | Middle Tank_Bottom |
| P/CODE | CSCCE12TM21O       |
| SIZE   | 630x790x550        |
| Weight |                    |



|        |               |
|--------|---------------|
| Name   | GuardRail_A   |
| P/CODE | CSCCK31GP11O  |
| SIZE   | 1219x455x3.0T |
| Weight |               |



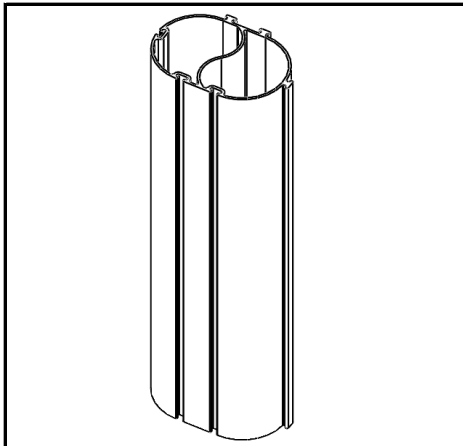
|        |               |
|--------|---------------|
| Name   | GuardRail_B   |
| P/CODE | CSCCK31GP21O  |
| SIZE   | 1219x455x3.0T |
| Weight |               |



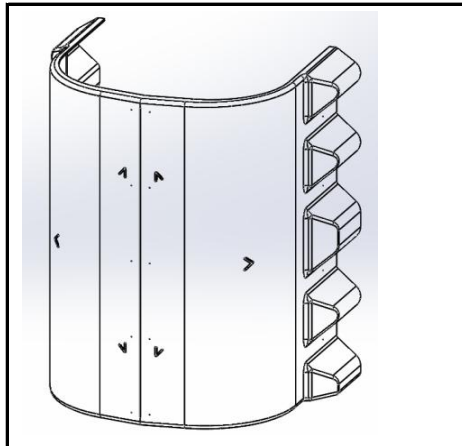
|        |               |
|--------|---------------|
| Name   | GuardRail_C   |
| P/CODE | CSCCK31GP31O  |
| SIZE   | 1219x420x3.0T |
| Weight |               |

## CCS\_Separate-Type Component List-[wire hold plate\_type]

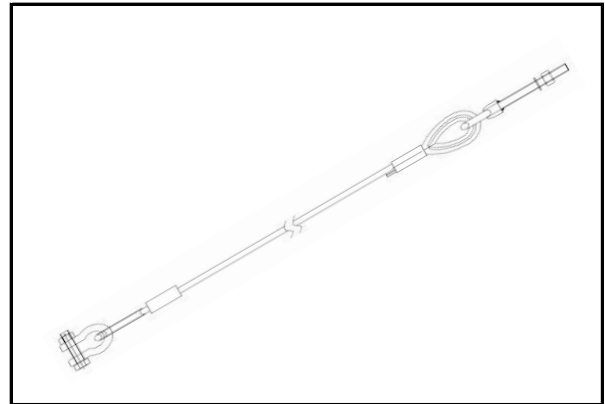
### \*Component List\_2



|        |              |
|--------|--------------|
| Name   | Al Absorber  |
| P/CODE | CSCCK31AB11T |
| SIZE   | 150x100x500  |
| Weight |              |



|        |              |
|--------|--------------|
| Name   | Front Sheet  |
| P/CODE | CSCCE12FC11O |
| SIZE   | 800x900      |
| Weight |              |



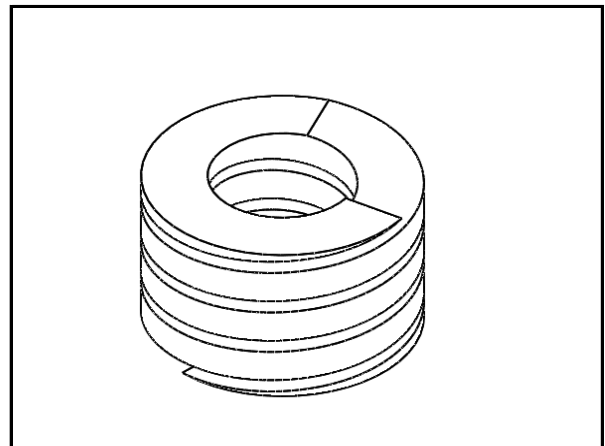
|        |                             |
|--------|-----------------------------|
| Name   | Wire Rope_Ass'y<br>_110&100 |
| P/CODE | CSCCE31WR11T                |
| SIZE   | 24Øx7310                    |
| Weight |                             |



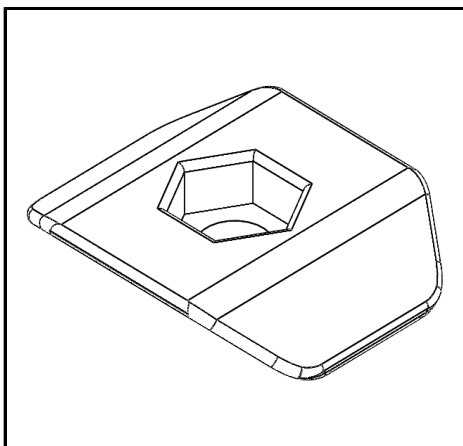
|        |                    |
|--------|--------------------|
| Name   | Wire Rope_Ass'y_80 |
| P/CODE | CSCCE21WR11T       |
| SIZE   | 24Øx3750           |
| Weight |                    |



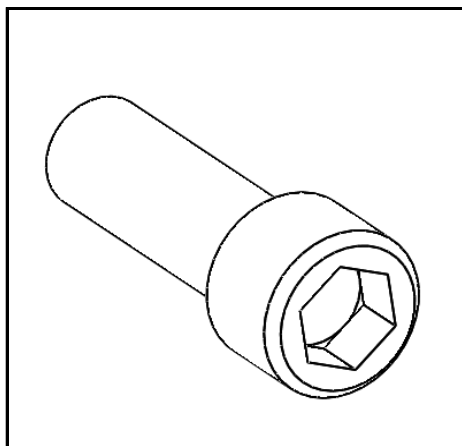
|        |                    |
|--------|--------------------|
| Name   | Wire Rope_Ass'y_50 |
| P/CODE | CSCCE11WR11T       |
| SIZE   | 24Øx2915           |
| Weight |                    |



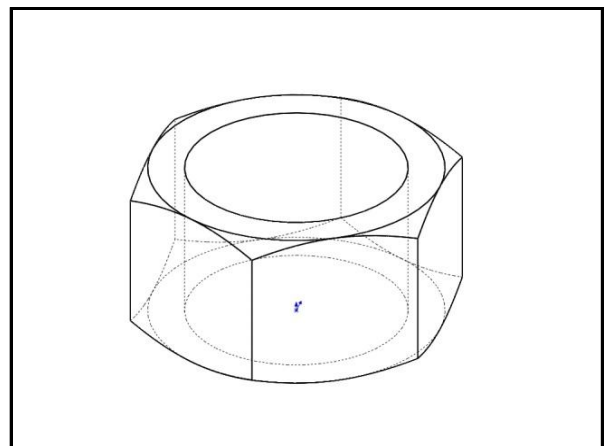
|        |              |
|--------|--------------|
| Name   | Coil Spring  |
| P/CODE | CSCCK31SP11T |
| SIZE   | 40x40x12.8   |
| Weight |              |



|        |              |
|--------|--------------|
| Name   | Spacer Bar   |
| P/CODE | CSCCK11SB11O |
| SIZE   | 105x86x21    |
| Weight | 16.2Kg       |



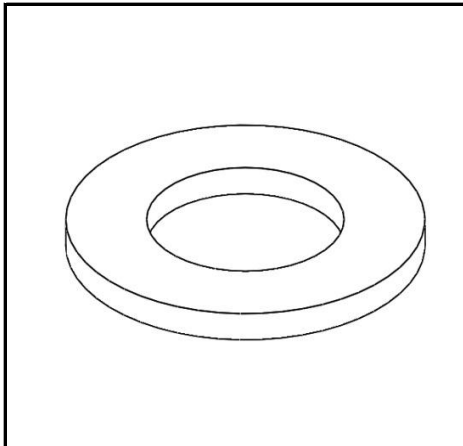
|        |                   |
|--------|-------------------|
| Name   | Socket Head Screw |
| P/CODE | MTBML20060ML      |
| SIZE   | M20x60            |
| Weight |                   |



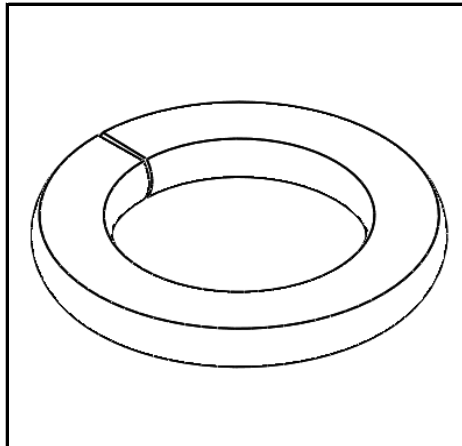
|        |             |
|--------|-------------|
| Name   | Hexagon Nut |
| P/CODE | MTNM220SL   |
| SIZE   | M20         |
| Weight | 0.05Kg      |

## CCS\_Separate-Type Component List-[wire hold plate\_type]

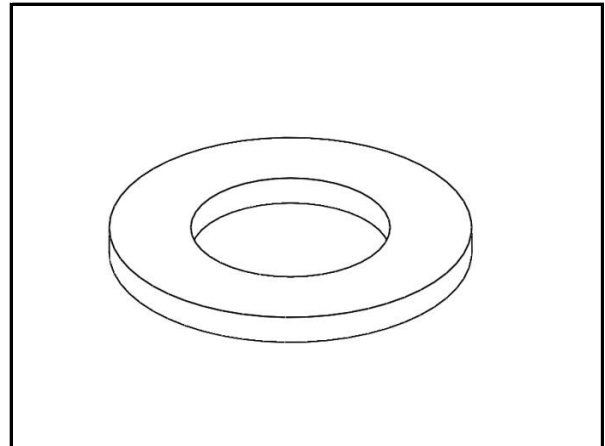
### \*Component List\_3



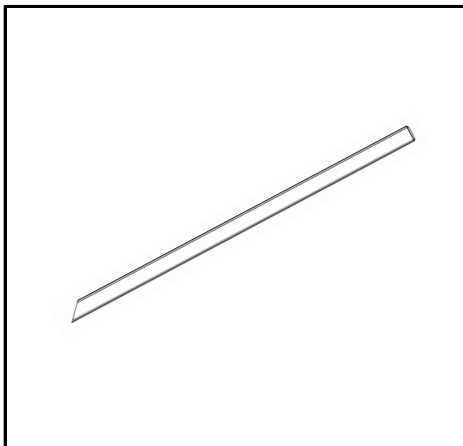
|        |               |
|--------|---------------|
| Name   | Plain Washer  |
| P/CODE | MTWP020SL     |
| SIZE   | 37Ø(21Ø)X3.0T |
| Weight |               |



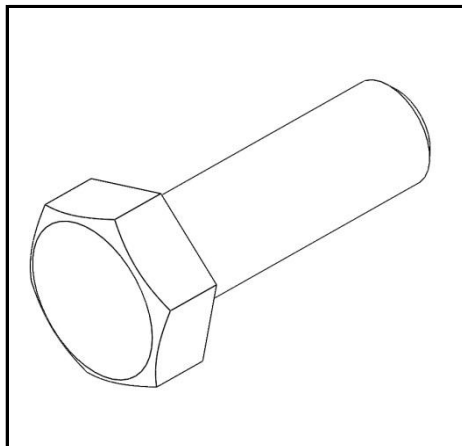
|        |               |
|--------|---------------|
| Name   | Spring Washer |
| P/CODE | MTWS020SL     |
| SIZE   | 21Ø           |
| Weight |               |



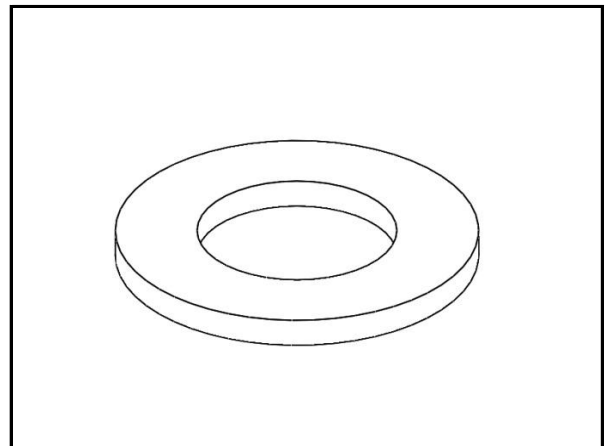
|        |              |
|--------|--------------|
| Name   | Plain Washer |
| P/CODE | MTWP016U     |
| SIZE   | 16Ø          |
| Weight |              |



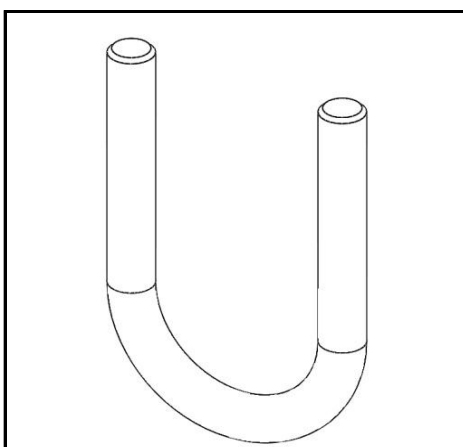
|        |                   |
|--------|-------------------|
| Name   | Bolt_Threated bar |
| P/CODE | MTBMY20500SL      |
| SIZE   | M20*500           |
| Weight |                   |



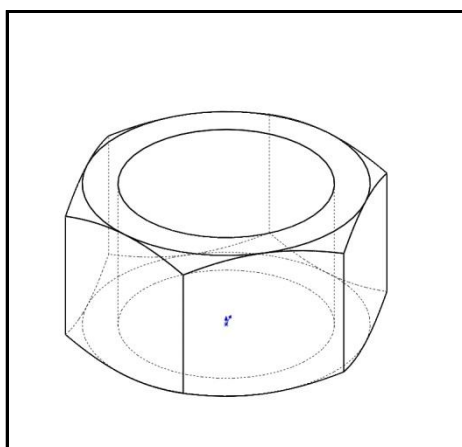
|        |              |
|--------|--------------|
| Name   | Hexagon Bolt |
| P/CODE | MTBMH10025SL |
| SIZE   | M10x25       |
| Weight |              |



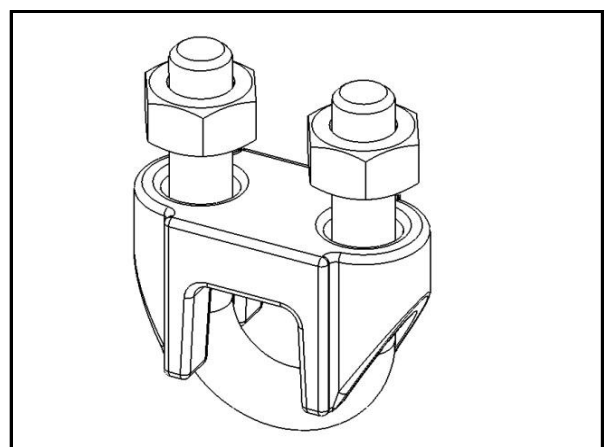
|        |              |
|--------|--------------|
| Name   | Plain Washer |
| P/CODE | MTWP010SL    |
| SIZE   | 10Ø          |
| Weight |              |



|        |              |
|--------|--------------|
| Name   | U_Bolt       |
| P/CODE | MTBMU168090U |
| SIZE   | M16x80       |
| Weight | 0.45Kg       |



|        |             |
|--------|-------------|
| Name   | Hexagon Nut |
| P/CODE | MTNM216U    |
| SIZE   | M16         |
| Weight | 0.01Kg      |

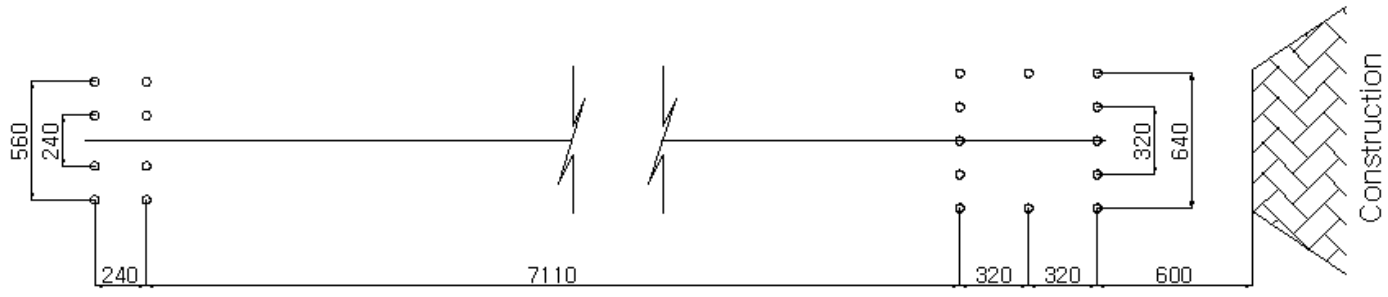


|        |                 |
|--------|-----------------|
| Name   | Wire Clip_Ass'y |
| P/CODE | MTL11SL         |
| SIZE   | 1 1/8"          |
| Weight | 0.85Kg          |

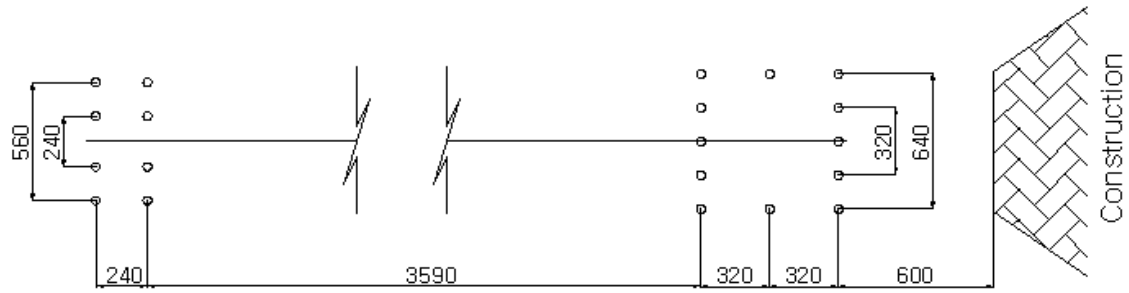
# Assembly Step By Step Instruction For CCS (Parallel)

## □ Assembly Step 1

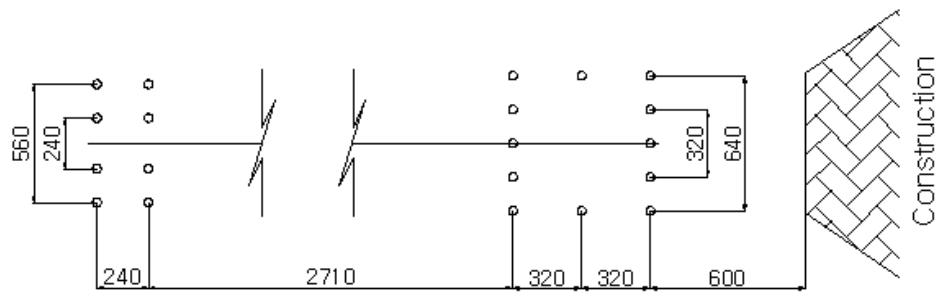
- Mark for drilling the holes of anchors(Concrete Anchor&Movable Plate&Asphalt Type)



100km/h & 110km/h  
EU-CCS-PS-A-100/110



80km/h  
EU-CCS-PS-A-80



50km/h  
EU-CCS-PS-A-50

## □ Explanation

1. locate the installation place, and mark for drilling the holes of anchors
2. Follow the construction dimension drawing above for the hole marking
3. Apply the minimum separation distance from a structure(630mm) for the installation

▣ **Assembly Step 2**

- Drill the holes of anchors for the installation of the product

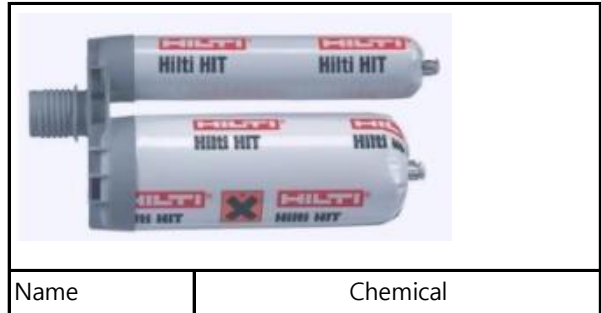
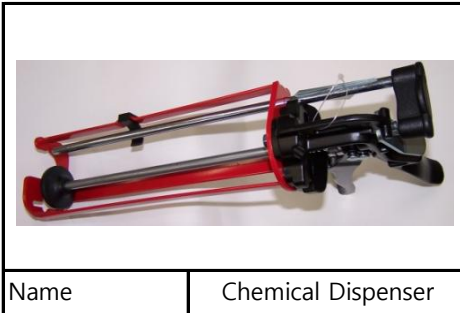


▣ Explanation

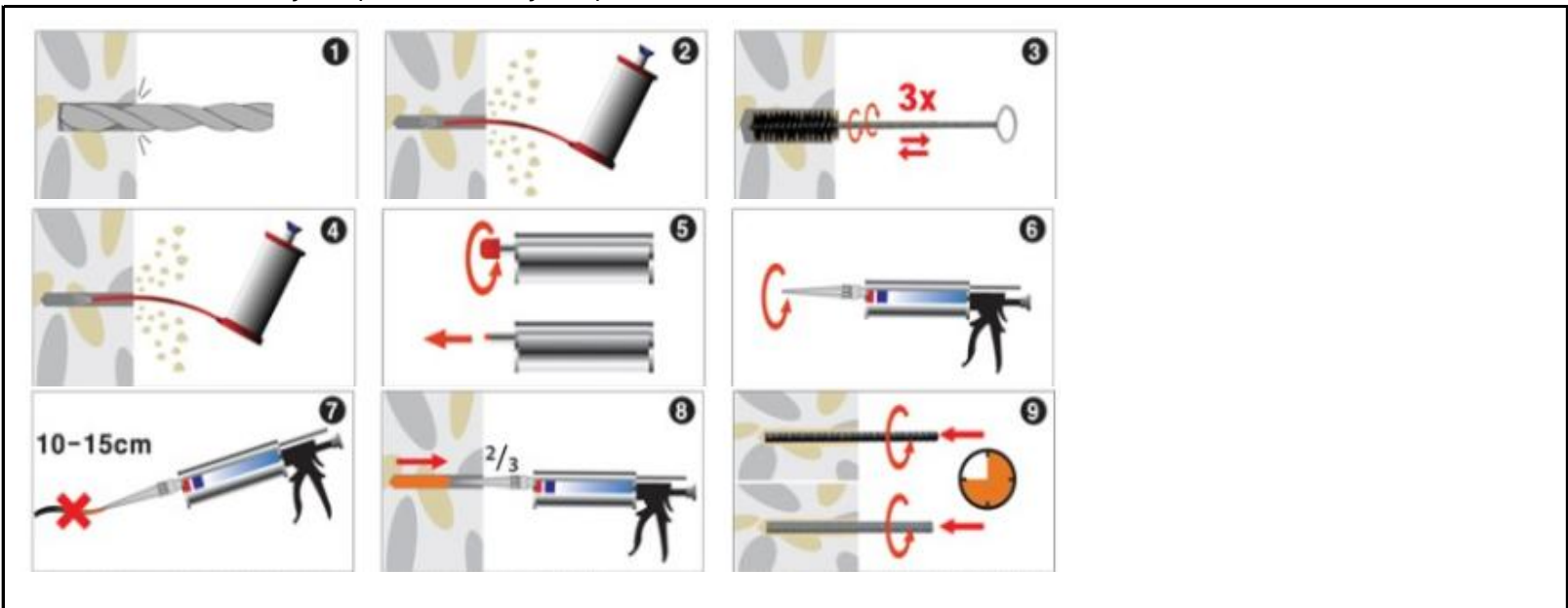
1. Drill the marks (step1) for the holes of anchors using a hammer drill with drill bits 26mm
2. Drill vertically to the ground, and the depth of holes should be 190 ~ 200mm
3. Clear the site the when when finished the wrok

▣ **Assembly Step 3**

- Fix the anchors in the ground for instsallation of the product



\* Reference: [Assembly Step 2~Assembly Step 3]

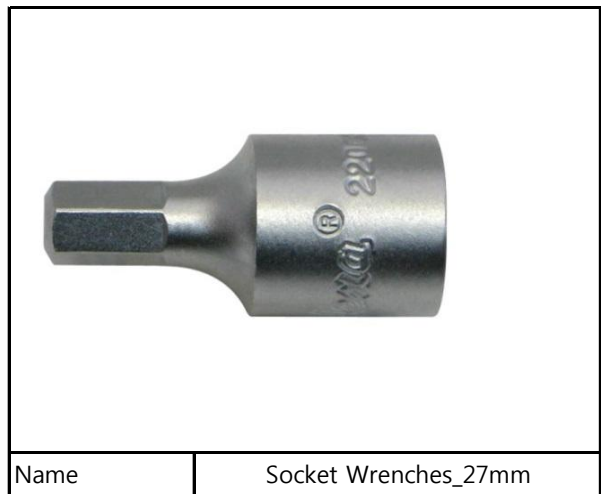
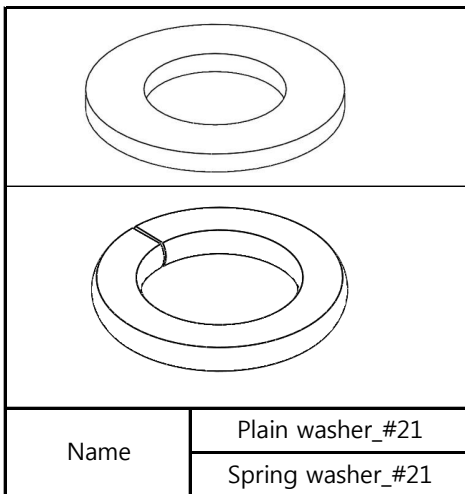
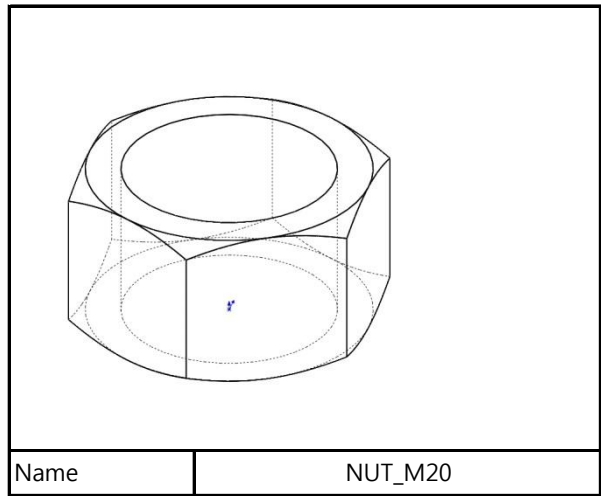
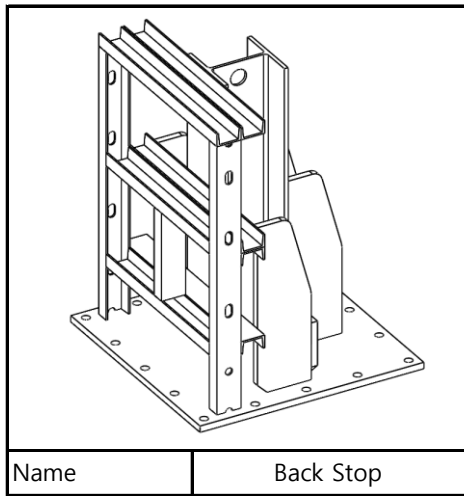
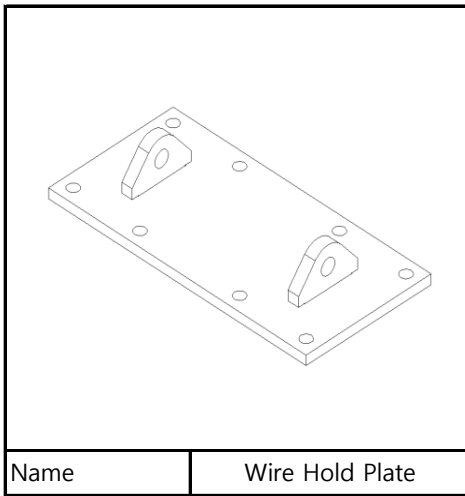
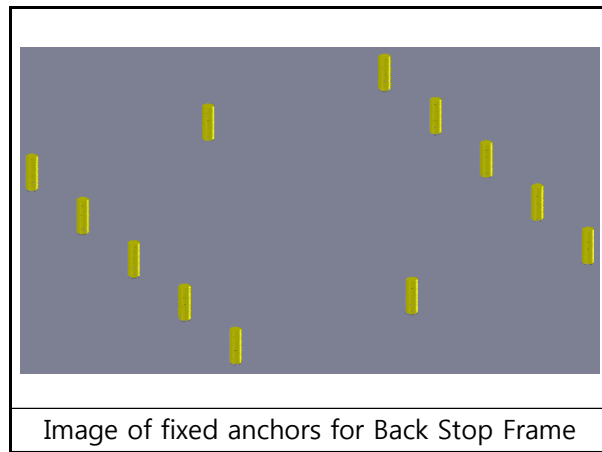
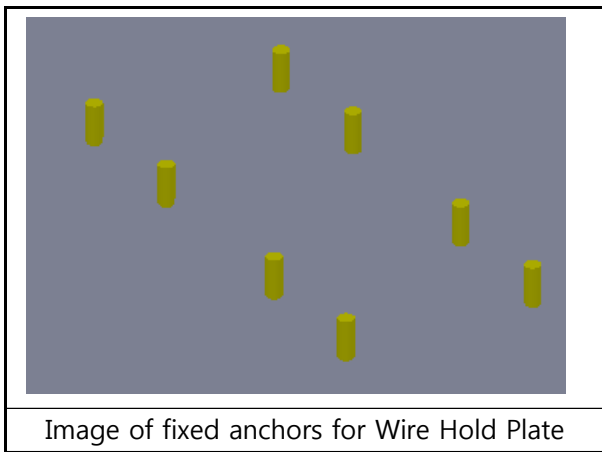


▣ Explanation

1. Drill the marks (step1) for the holes of anchors using a hammer drill with drill bits 26mm  
- The depth of the holes should be 450mm
2. Remove the debris in holes by the air
3. Clean the holes using the brush
4. Remove the debris in holes by the air again
- 5~7. Install the Chemical Dispenser with the Chemical, but do not use first 10-15cm of Chemical as unworkable
8. Inject the Chemical into the hole; the amount of injection should be 30cm
9. Put the Chemical anchor into holes with spinning it in an anticlockwise direction, and them wait until hardened

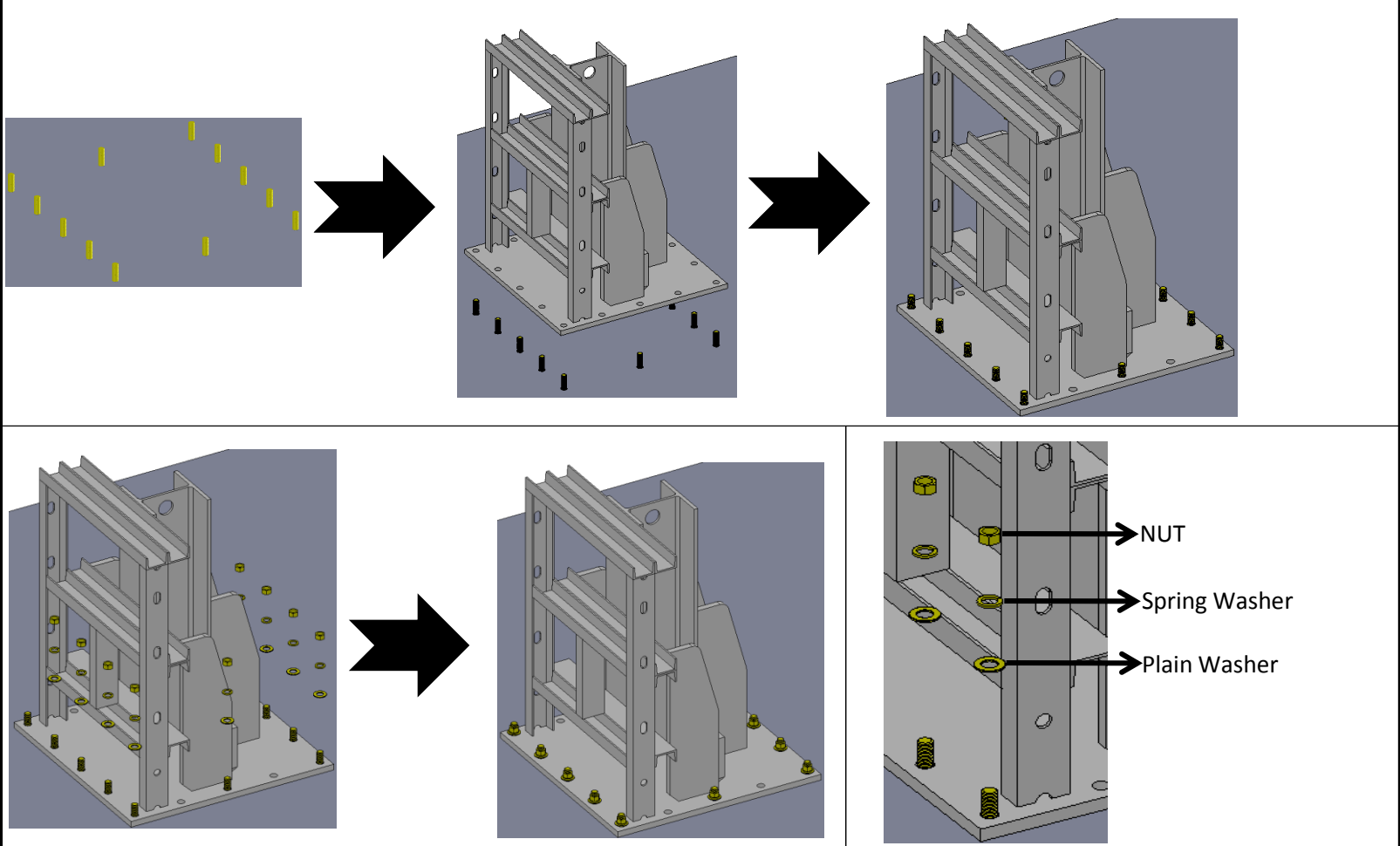
▣ **Assembly Step 4**

- Fix the Back Stop Frame, Wire Hold Plate and Rotation Bracket.





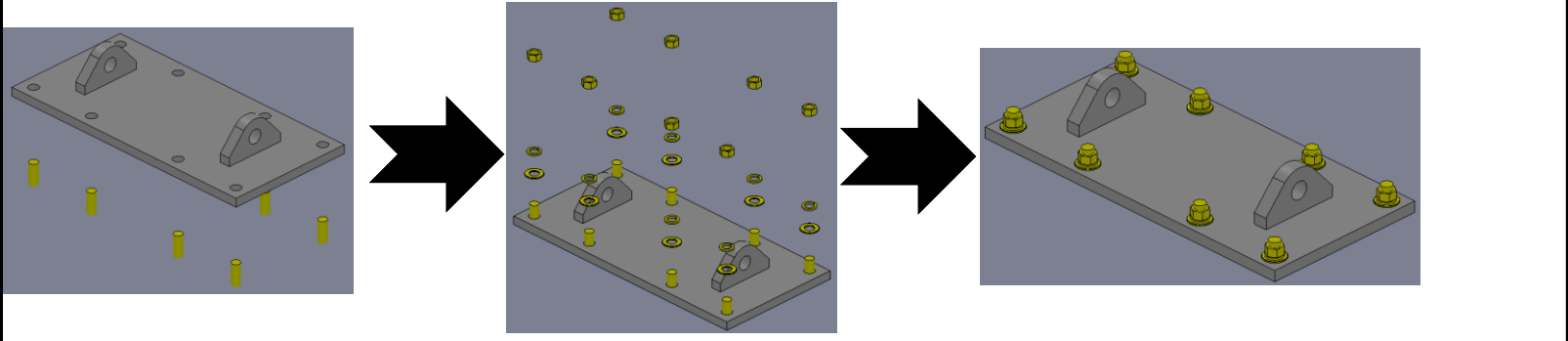
□ Assembly 4-1 [Setting of Back Stop]



□ Explanation

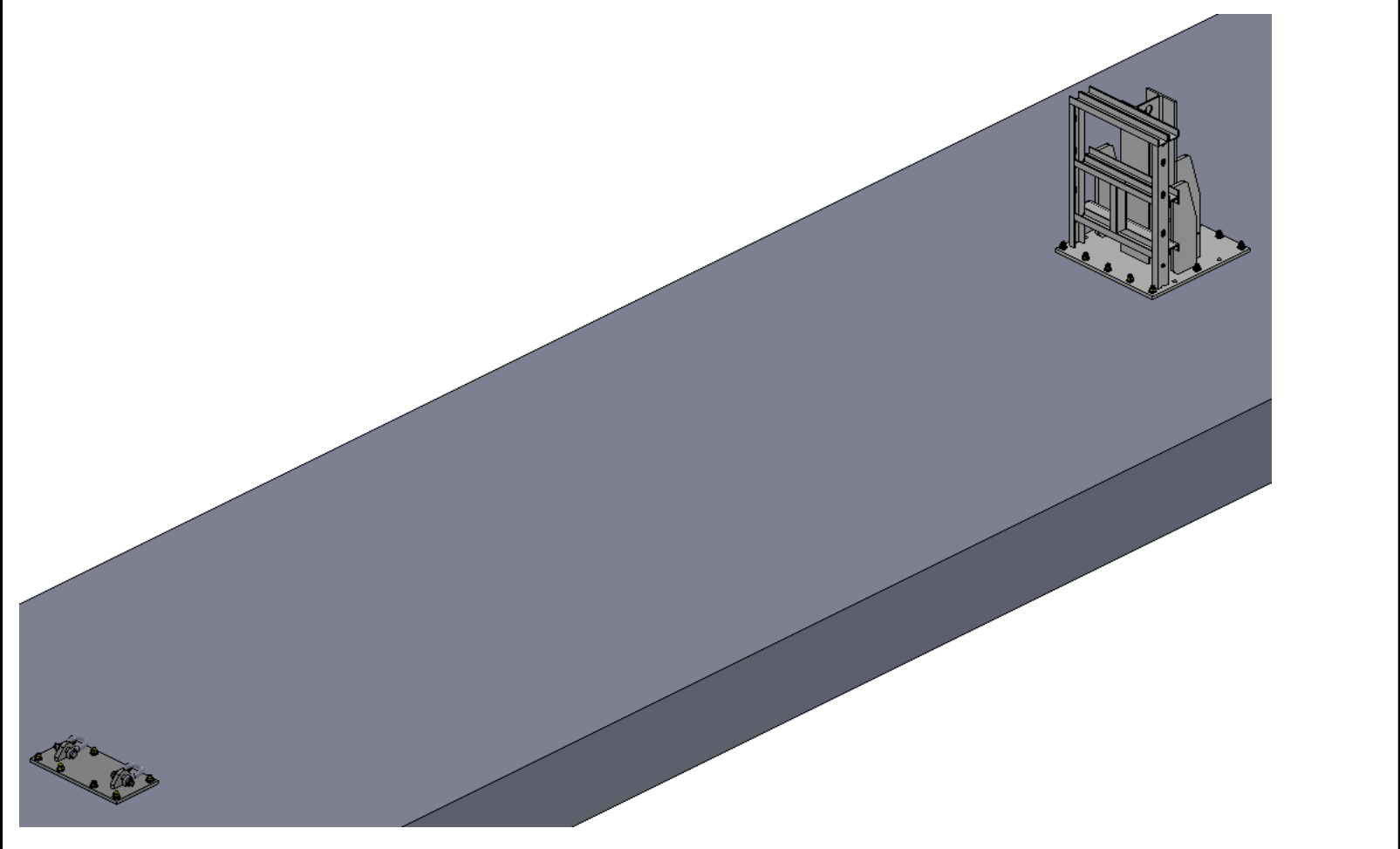
1. Insert the Anchor Bolt into Back stop
  2. Tighten Plain Washer & Spring Washer & Nut in order into the chemical anchor
  3. Fix Nuts using Impct driver with Socket Wrenches\_27mm
- (Screwing toque value is 12kgf.m~15kgf.m)

□ Assembly Step 4-2 [Setting of Wire Hold Plate]



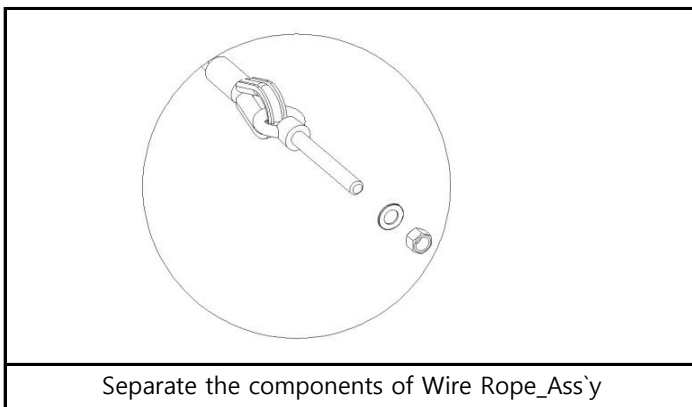
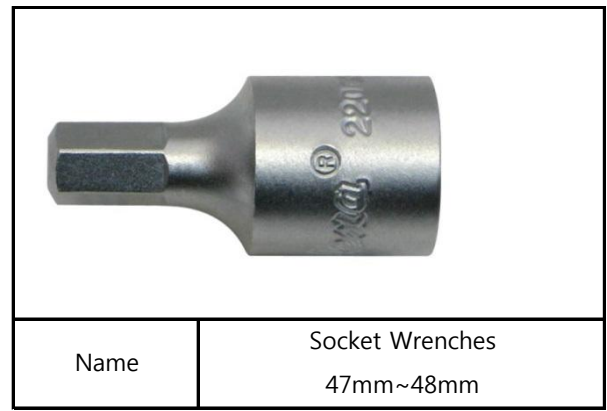
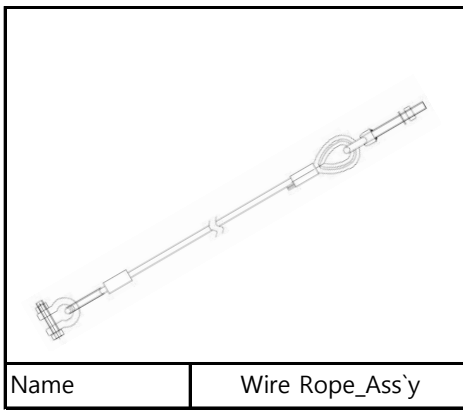
□ Explanation

1. Insert anchor bolts into Wire Hold Plate
2. Tighten Plain Washer & Spring Washer & Nut in order into the chemical anchor
3. Fix the nuts using the Impct driver with Socket Wrenches\_27mm  
(Screwing toque value is 12kgf.m~15kgf.m)



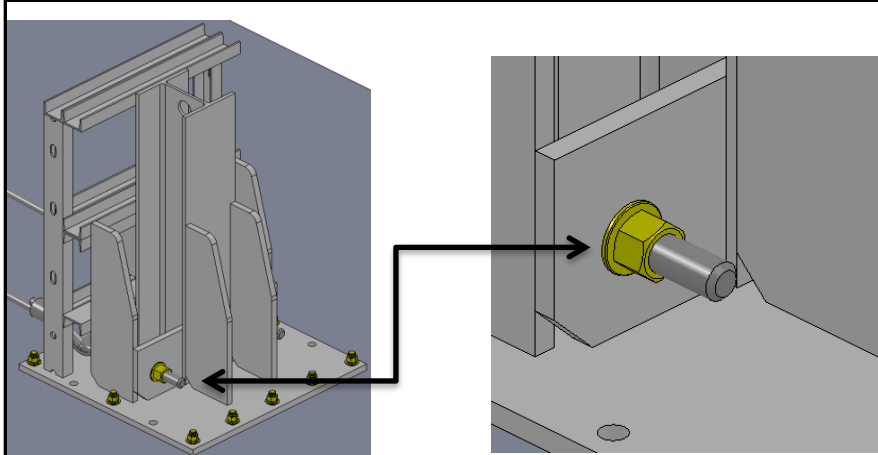
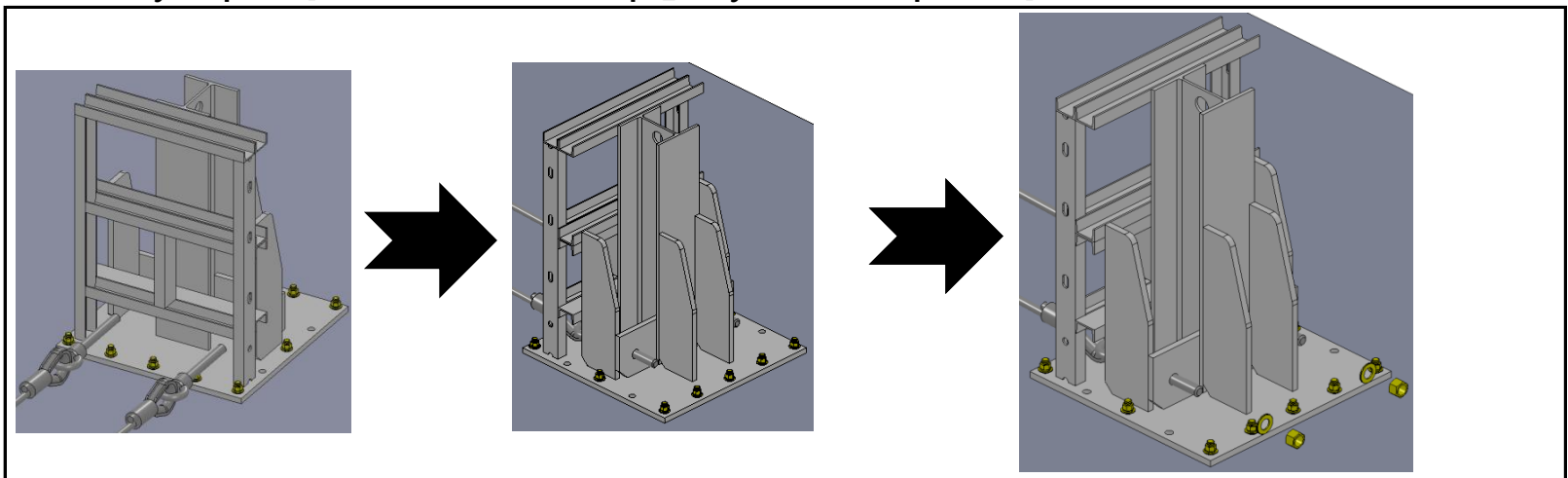
▣ **Assembly Step 5 [Connection of Wire Rope\_Ass`y]**

- Connect up the Wire Rope\_Ass`y to Back Stop Frame and Wire Hold Plate



Separate the components of Wire Rope\_Ass`y

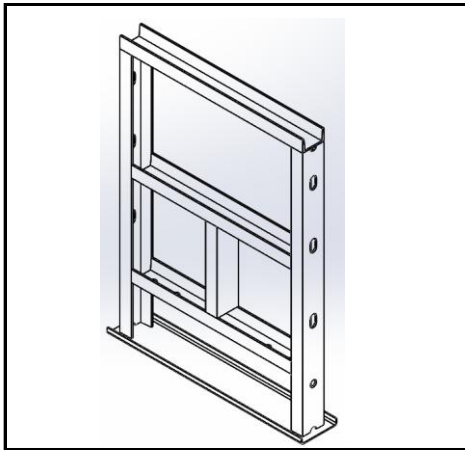
▣ **Assembly Step 5-1 [Connection of Wire Rope\_Ass`y to Back Stop Frame]**



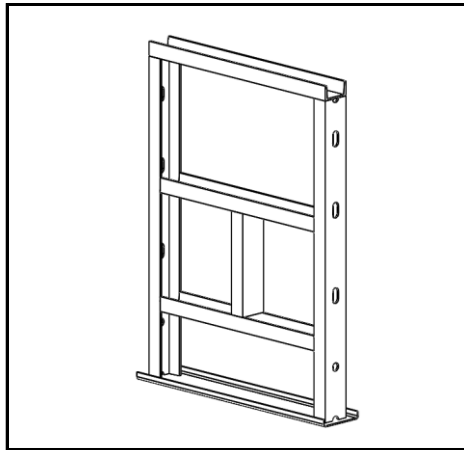
▣ **Explanation**

1. Insert separated components from Wire Rope\_Ass`y into holes on the bottom of the Back Stop Frame

□ Assembly Step 6[Setting the Position of Front Frame & Middle Frame]

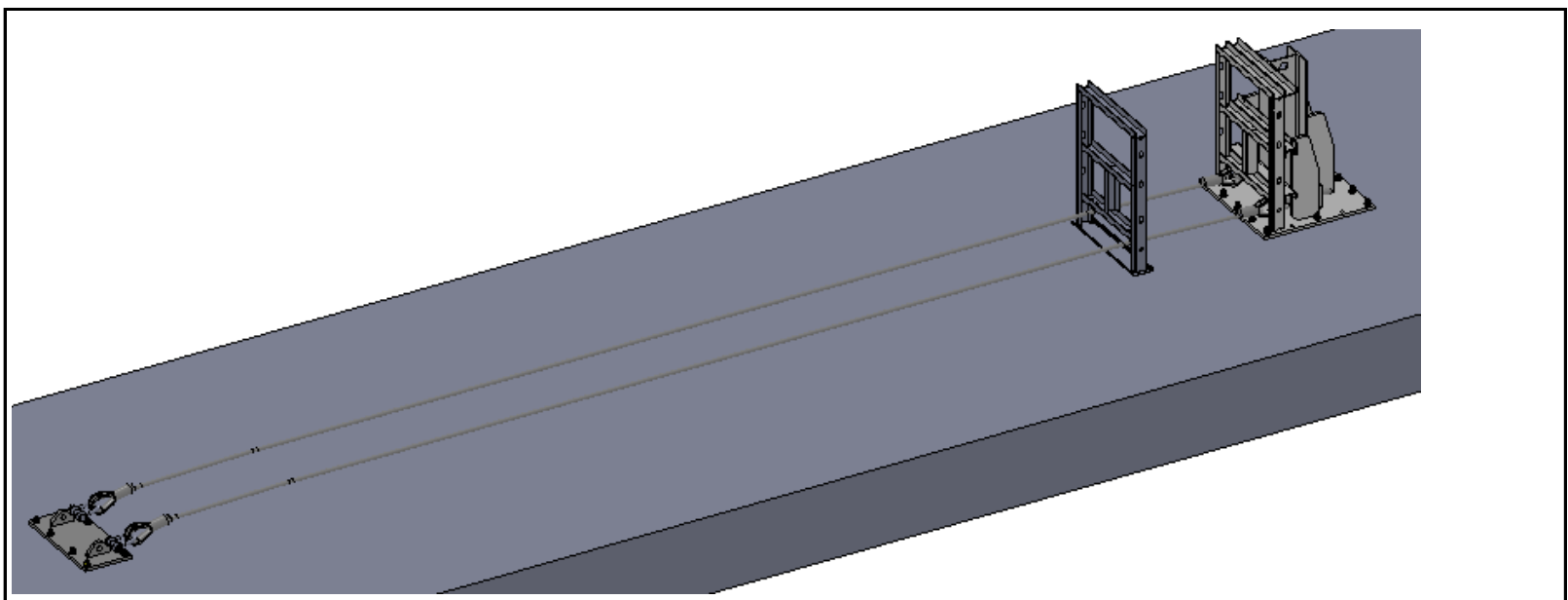
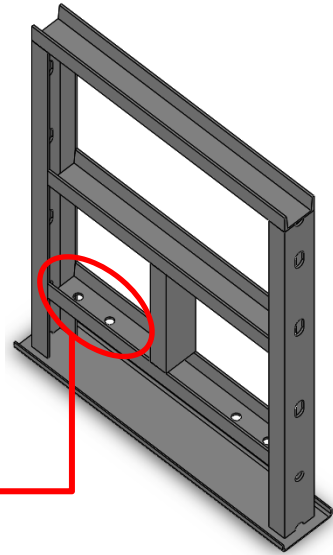


Name                      Front Frame



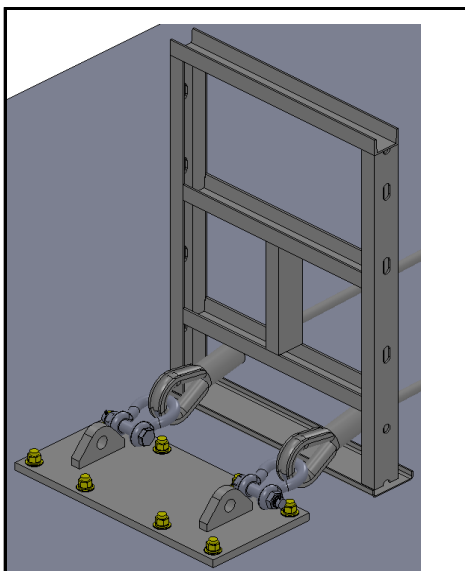
Name                      Middle Frame

The distinction between Front Frame and Middle Frame is the distance between holes.  
a\_Front frame\_80mm / b\_Middle frame\_50mm

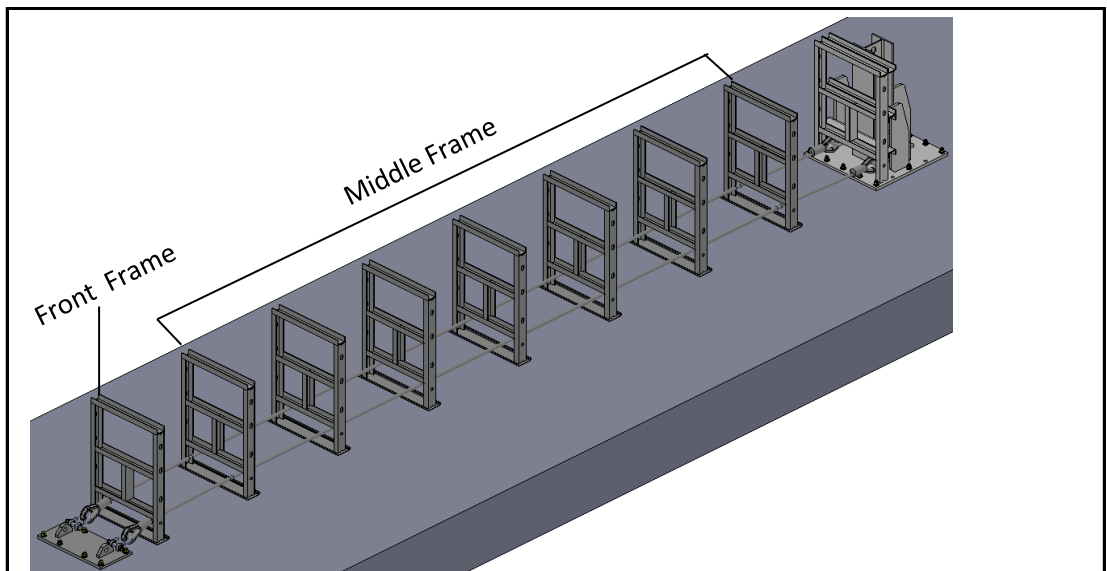


□ Explanation

1. To install Middle Frame and Front Frame, Put Wire Rope\_Ass'y in the bottom of Middle Frame and stall in order

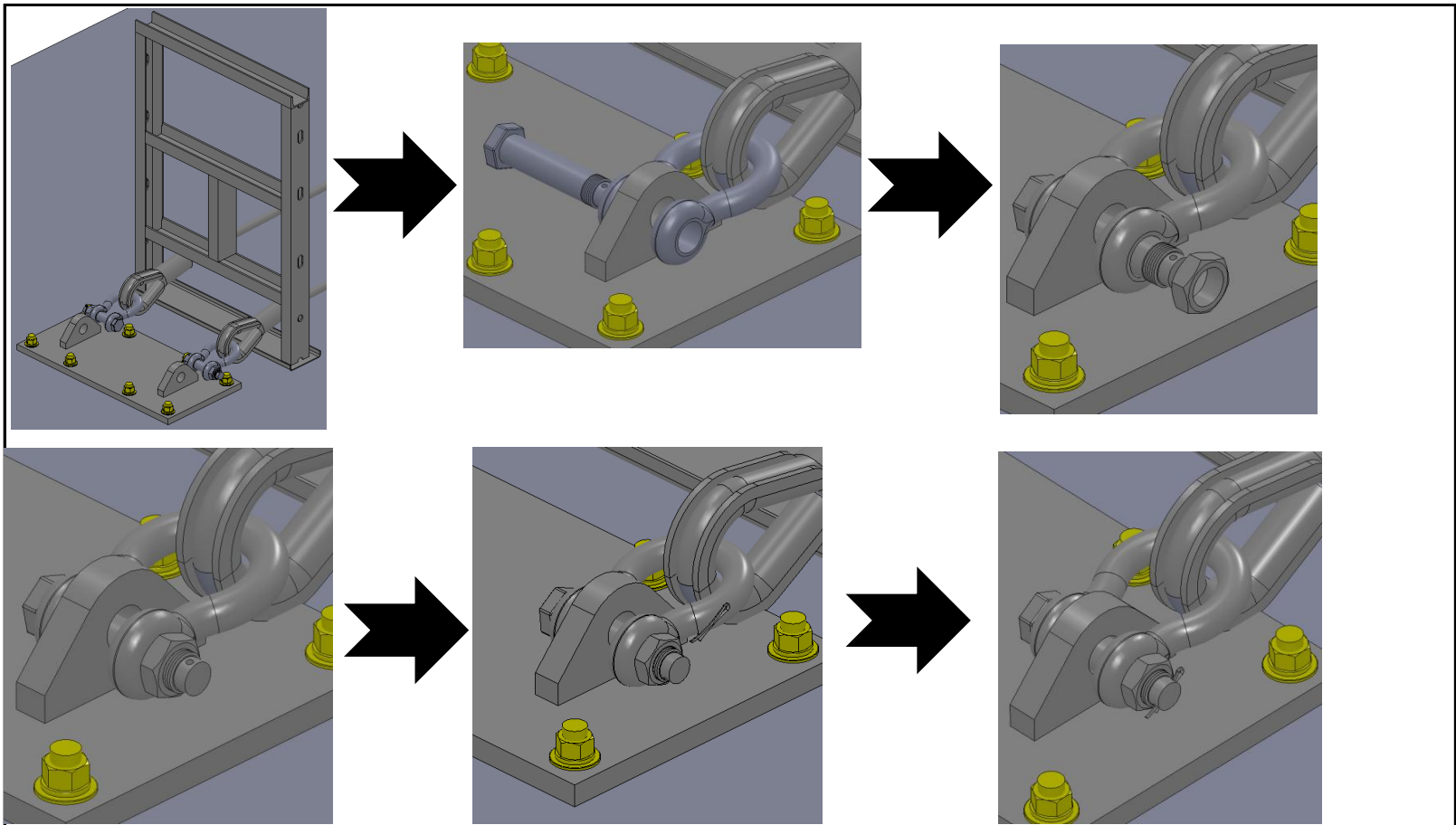
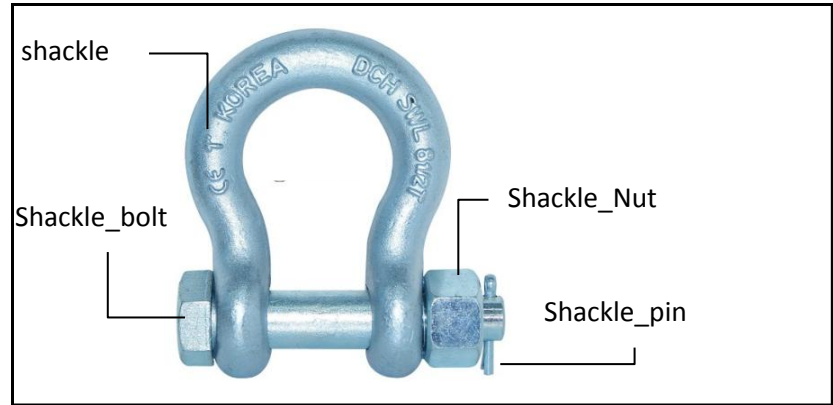
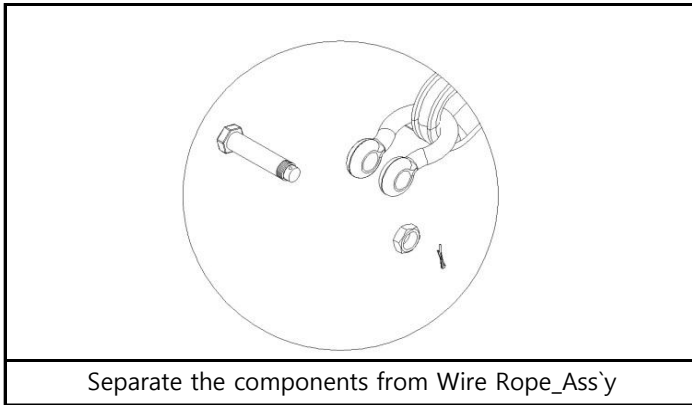


How to insert Frame



After inserting all the Frame

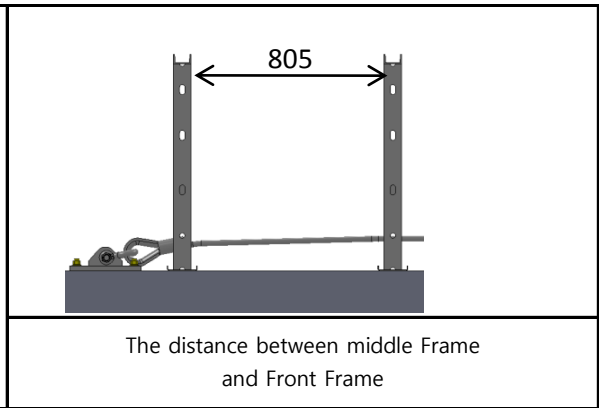
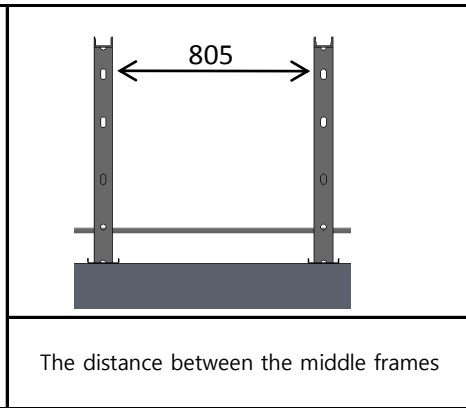
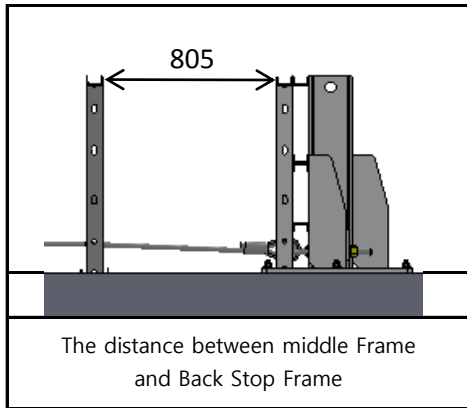
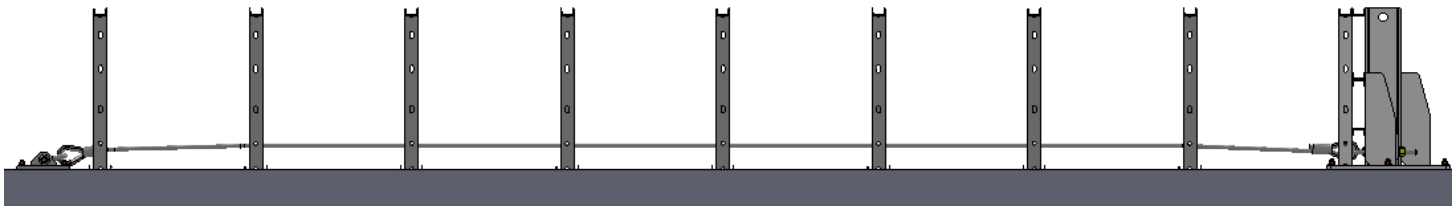
□ Assembly Step 6-1[Connection of Wire Rope\_Ass'y to Wire Hold Plate]



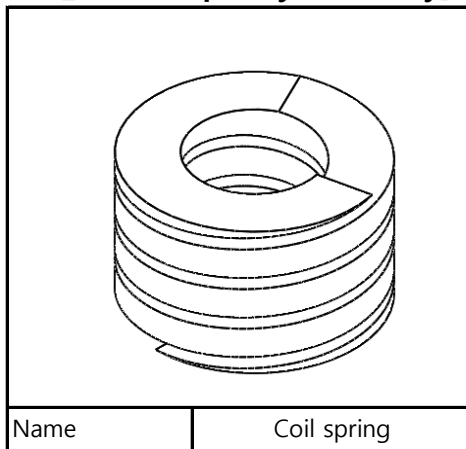
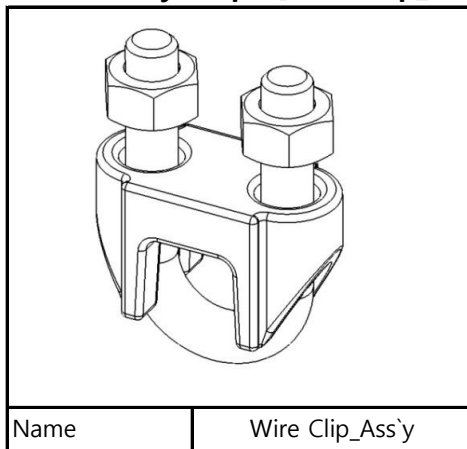
□ Explanation

1. Put the components from Wire Rope\_Ass'y into Wire Hold Plate
2. Put Shackle in the Wire Hold Plate, and connect them using Shackle\_bolt
3. Finish up the connection with putting the Shackle\_nut into the Shackle\_bolt
4. Insert Shackle\_pin into the hole at the end of Shackle\_bolt, and then transform Shackle\_pin not to fall out

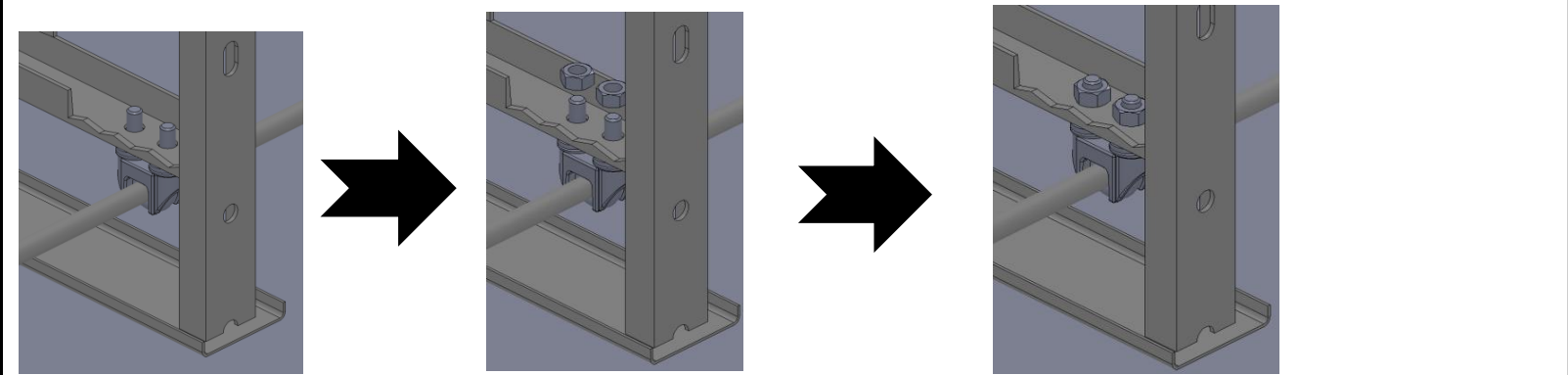
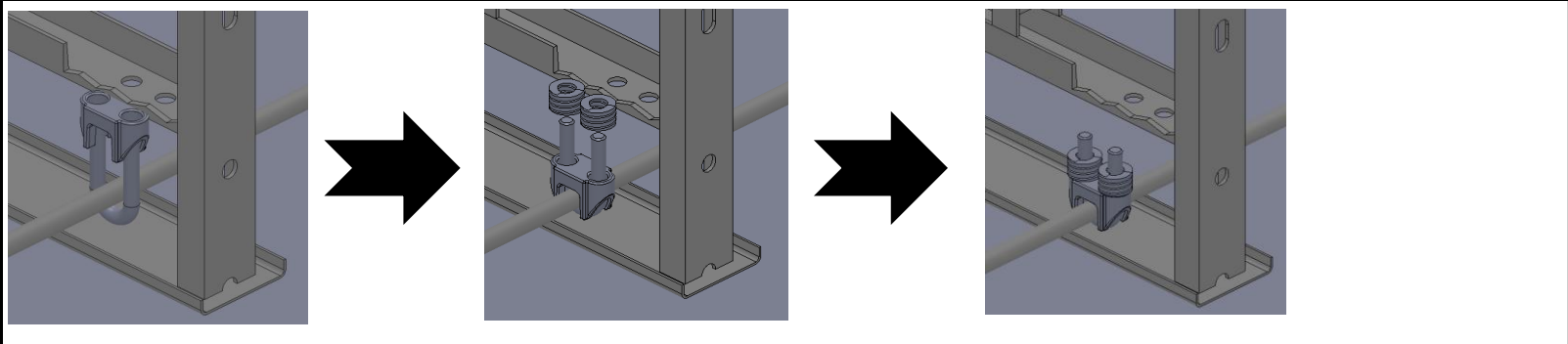
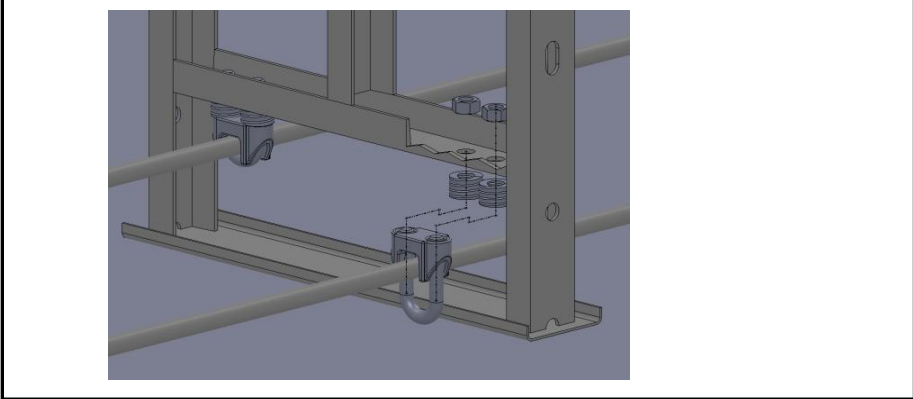
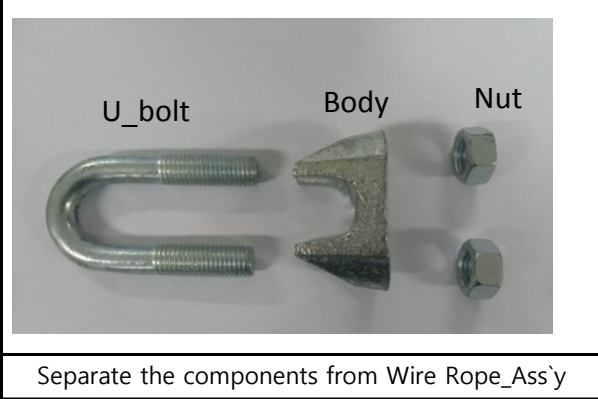
▣ Assembly Step 6-2[Adjust the Distance Interval of each Frame]



▣ Assembly Step 7[Wire Clip\_Ass'y & U\_Bolt Temporary-Assembly]

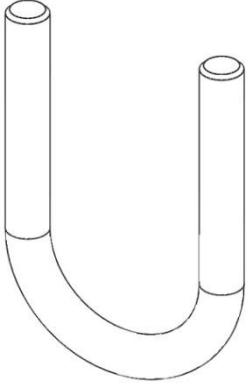
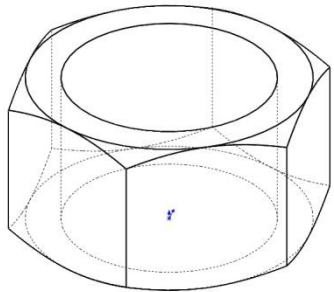
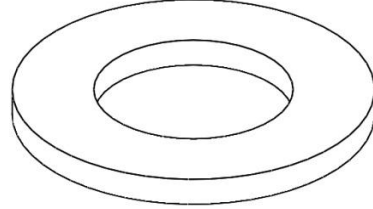


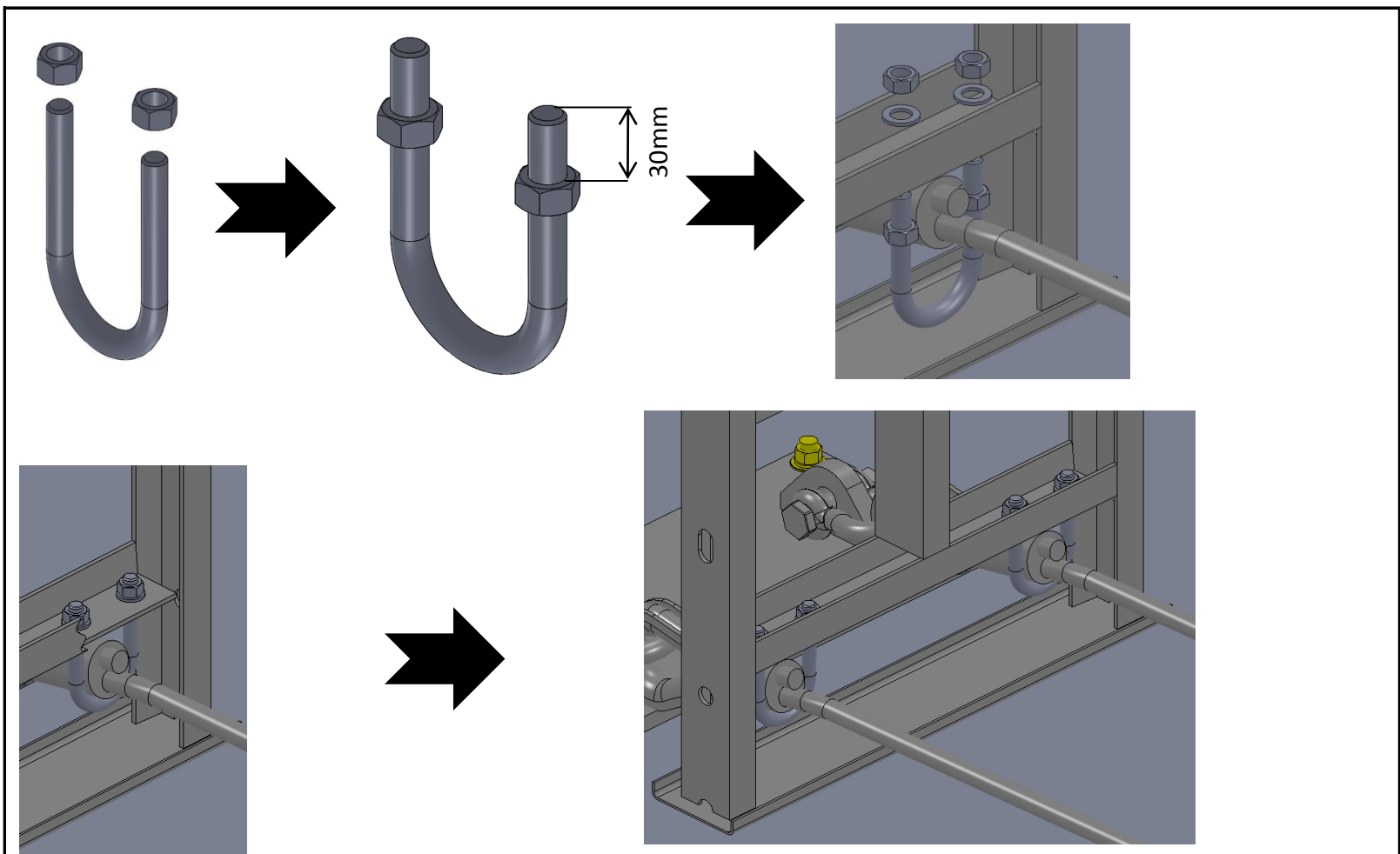
□ Assembly Step 7-1[Wire Clip Temporary-Assembly]



- Explanation
1. Separate the components from Wire Clip\_Ass'y, and put the Wire Rope between Wire Clip U\_Bolt and Wire Clip\_Body
  2. Put Coil spring into the Wire Clip U\_bolt assembled in Wire Rope, and insert it into holes on the bottom of Frame
  3. Insert the Wire Clip into holes on the bottom of Frame, and assemble it temporarily

▣ Assembly Step 7-2[U Bolt-Assembly]

|   |                |  |                  |   |                   |
|---|----------------|--|------------------|---|-------------------|
|  |                |  |                  |  |                   |
| Name  | U_Bolt(M16x80) | Name   | Hexagon Nut(M16) | Name  | Plain Washer(16Ø) |



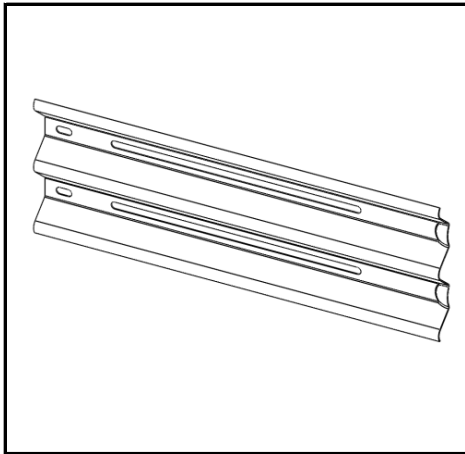
▣ Notice

1. Put the nut into U\_Bolt, and the depth should be 30mm as seen in the picture above
2. Put Wire Rope in U\_Bolt, and put the U\_Bolt into holes on the bottom of Front Frame
3. Joint the Plain Wahser and Nut to U\_Bolt inserted into holes on Front Frame

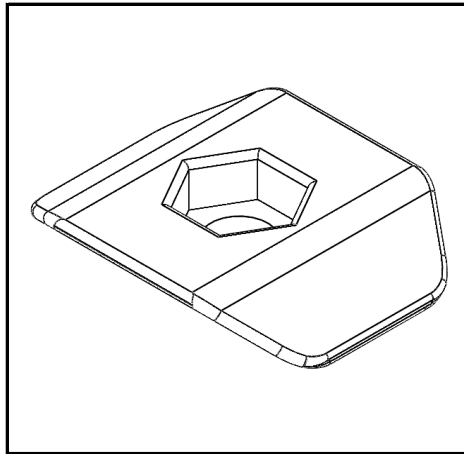


▣ Assembly Step 8[GuardRail Temporary-Assembly]

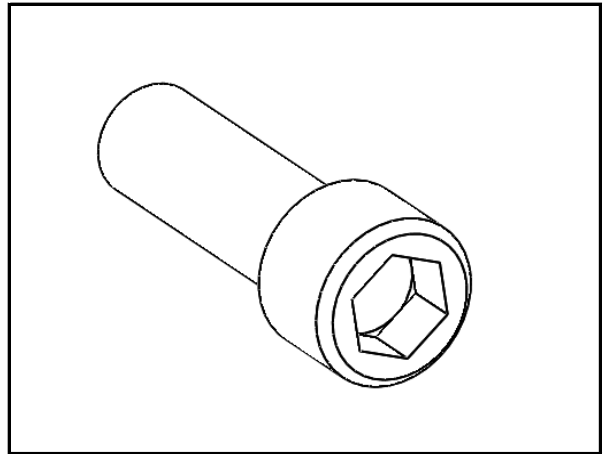
▣ Assembly Step 8-1[GuardRail\_C Temporary-Assembly]



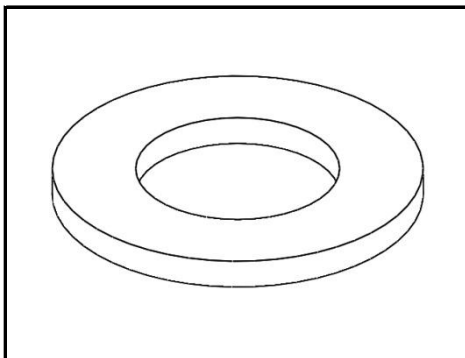
|      |             |
|------|-------------|
| Name | GuardRail_C |
|------|-------------|



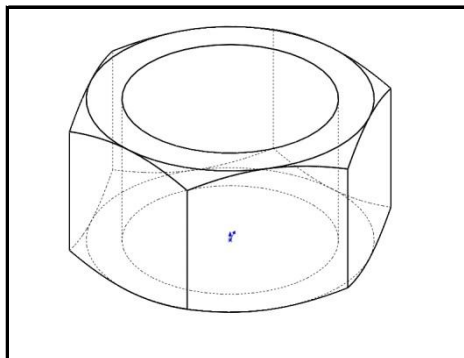
|      |            |
|------|------------|
| Name | Spacer Bar |
|------|------------|



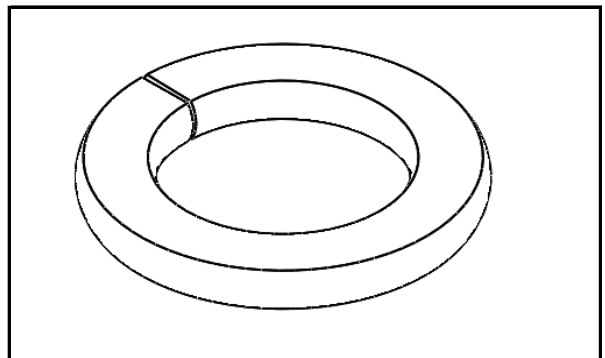
|      |                   |
|------|-------------------|
| Name | Socket Head Screw |
|------|-------------------|



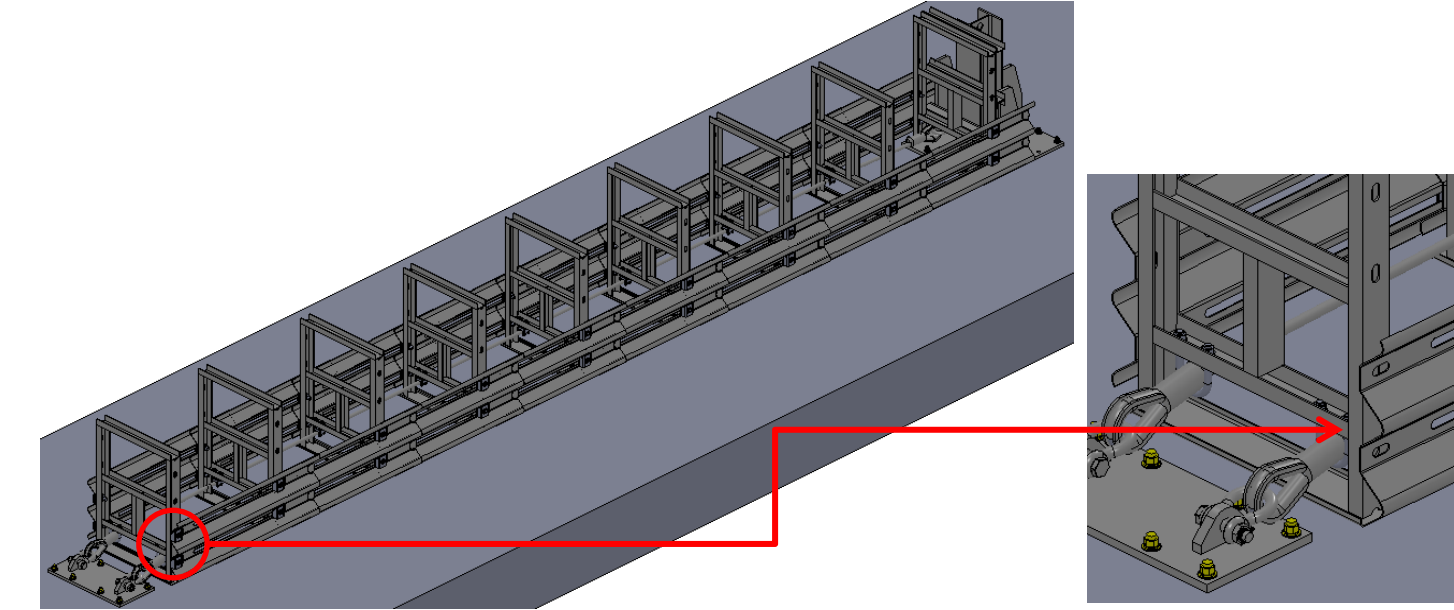
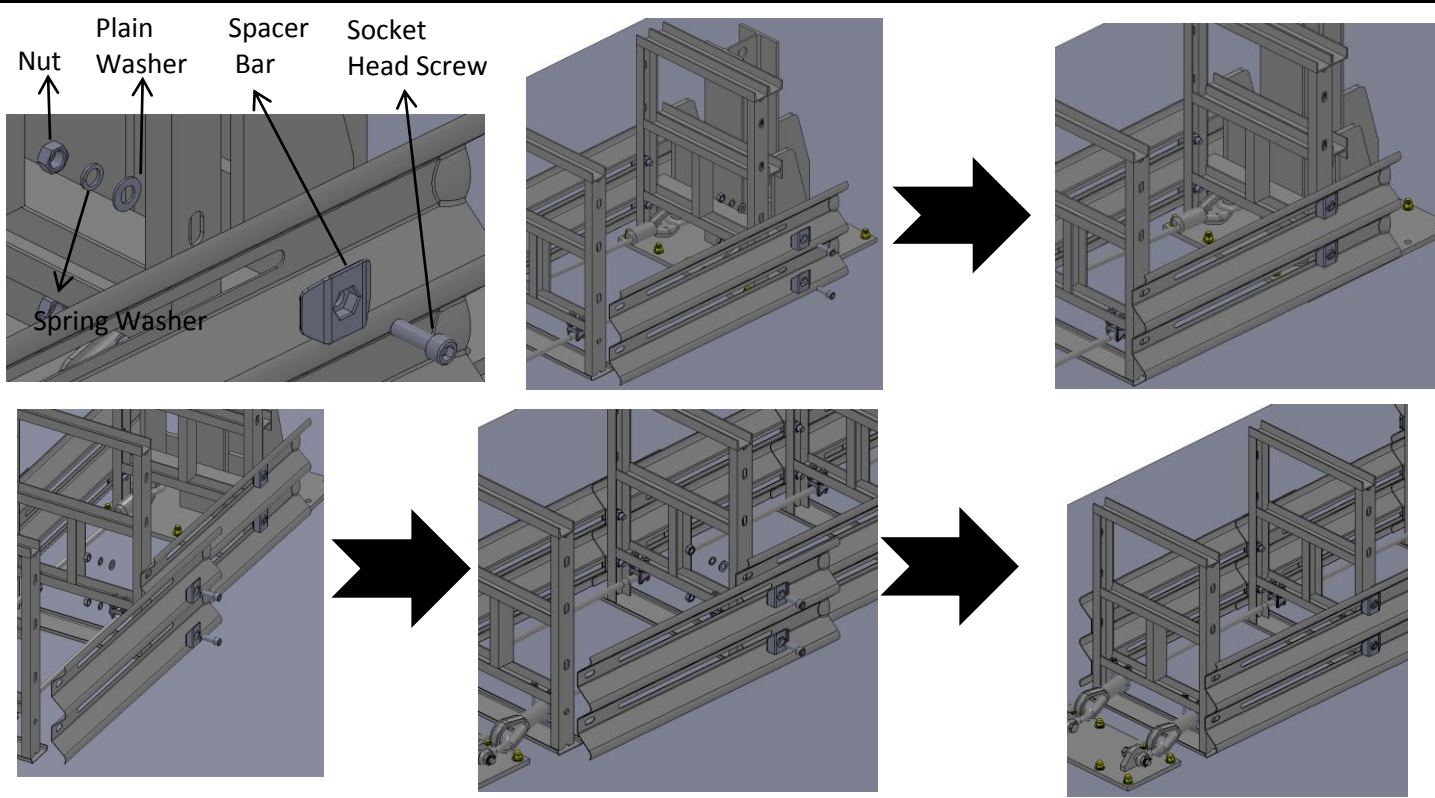
|      |                  |
|------|------------------|
| Name | Plain Washer_#21 |
|------|------------------|



|      |                 |
|------|-----------------|
| Name | Hexagon Nut_M20 |
|------|-----------------|



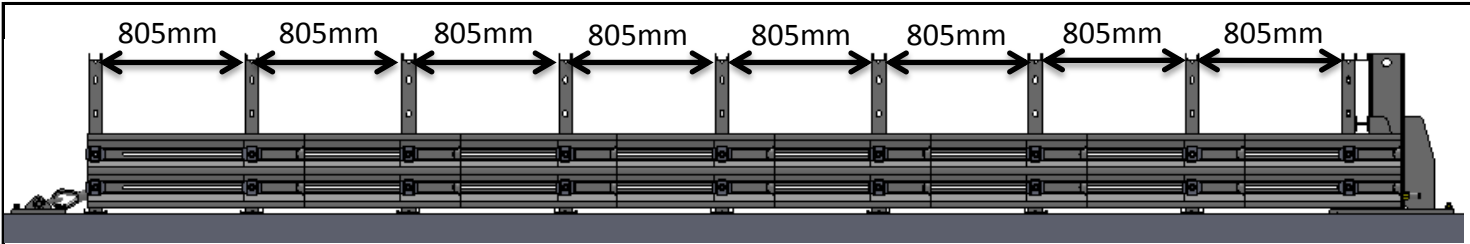
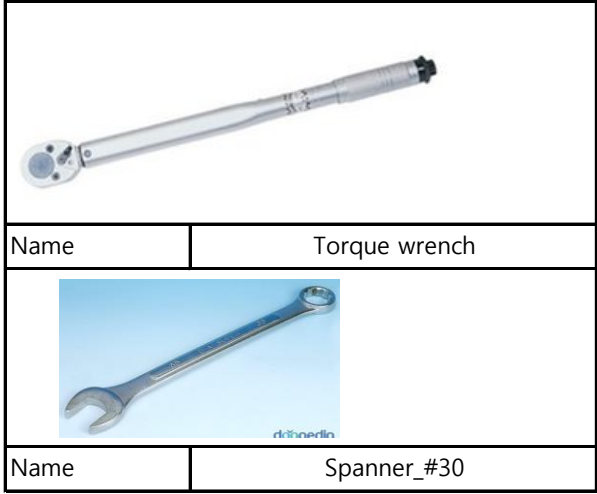
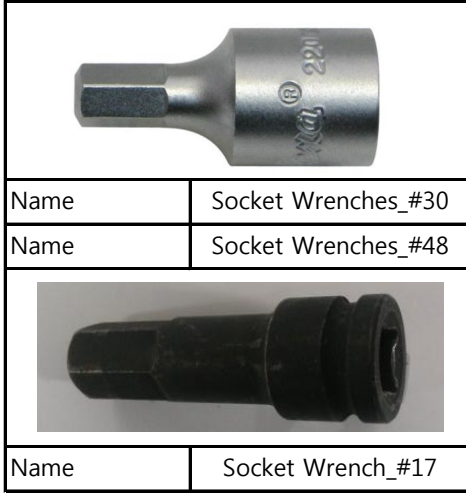
|      |                   |
|------|-------------------|
| Name | Spring washer_#21 |
|------|-------------------|



□ Explanation

1. Assemble GuardRails in order from the Back Stop Frame to Front Frame
  2. Assemble the GuardRail into the frame with Spacer Bar, Plain Washer and Nut(M20)
  3. The joint of Socket Head Screw and Nut should be temporary at this moment
- ★The assembly of Front Frame and Guard rail\_C should be assembled with Front sheet after the assembly of Guard rail\_(A,B)

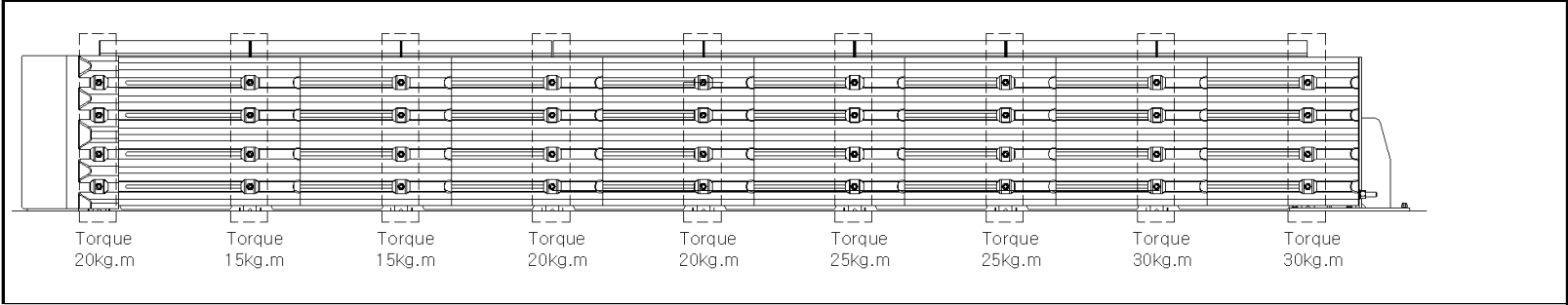
□ Assembly Step 8-2[Setting of GuardRail\_C and Wire Clip]



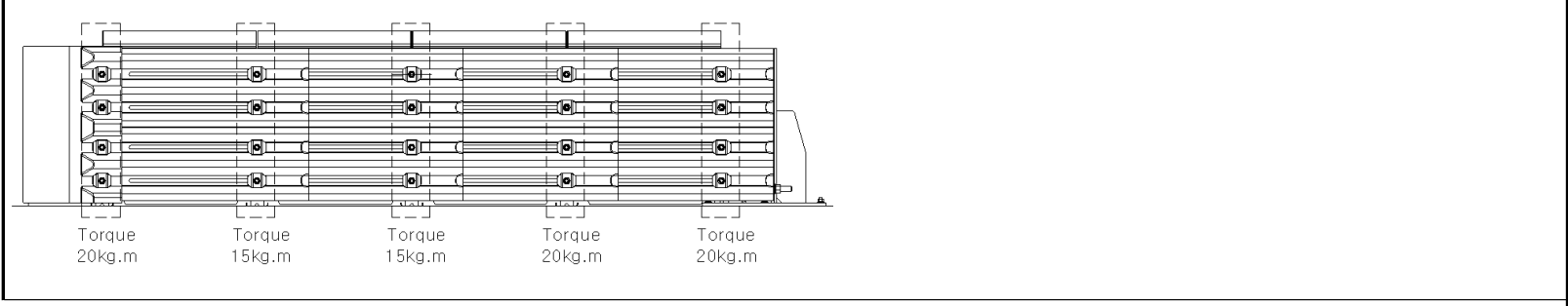
- Explanation
1. Re-locate each frame in order to assemble temporary-assembled Guard rail\_C completely as seen in the picture above
  2. Start step-1 using the Impact Driver with Socket Wrench\_#17
  3. After complete step-2, finish the assemble of the Bolts using the Torque wrench
    - Fix the Nut on the back of Frame not to spin using Spanner\_#30
  - ☞ See Table-1) for the value of guardrail screwing torque
  4. Tighten the bolts and nuts jointed on wire Rope and Back stop using Torque wrench based on Torque value(45kg.m)
  5. Tighten the nuts temporary-assembled on Wire Clip\_U Bolt using Torque wrench based on Torque value(10kg.m)

Table-1)

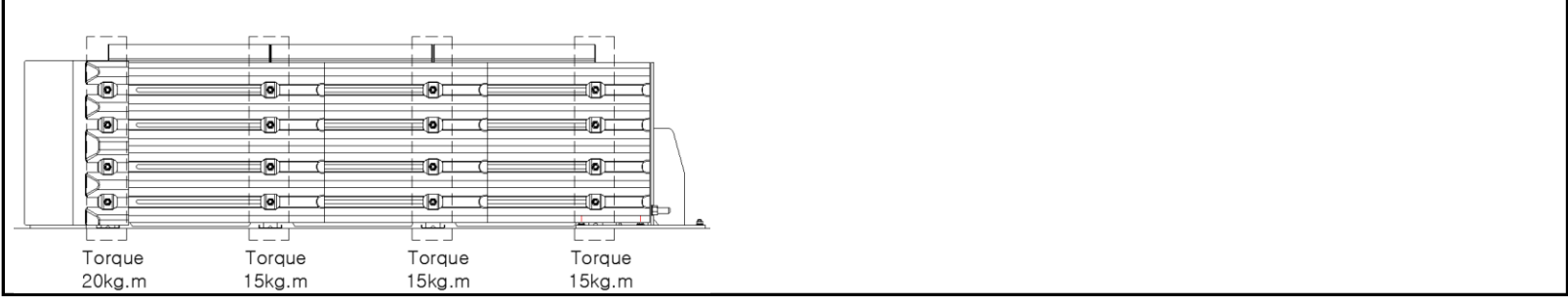
CC110km/h & CC100km/h



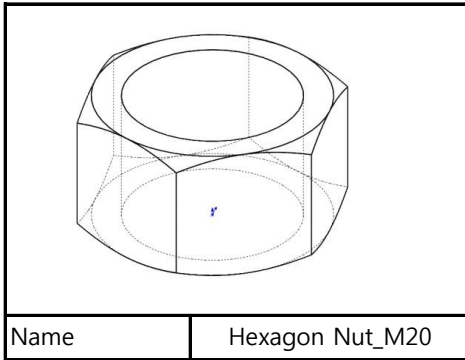
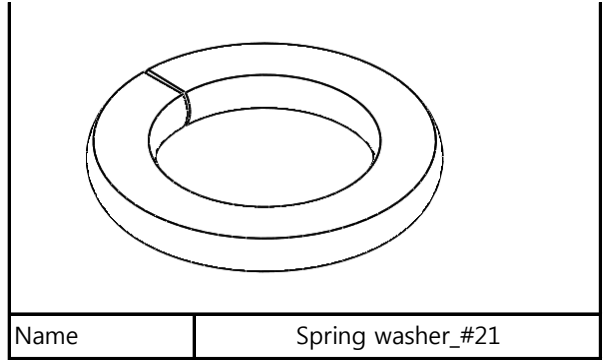
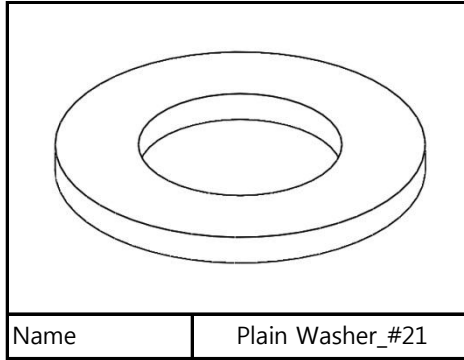
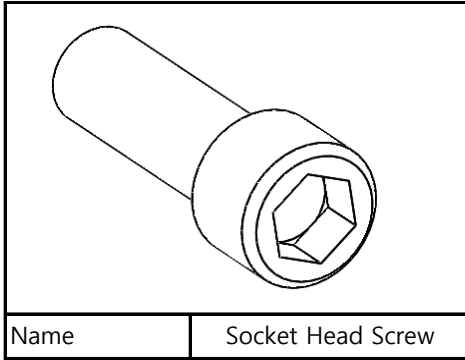
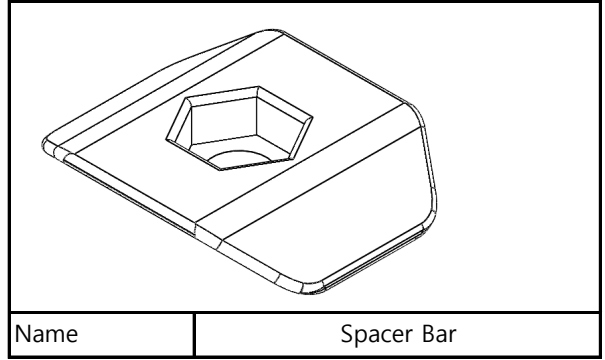
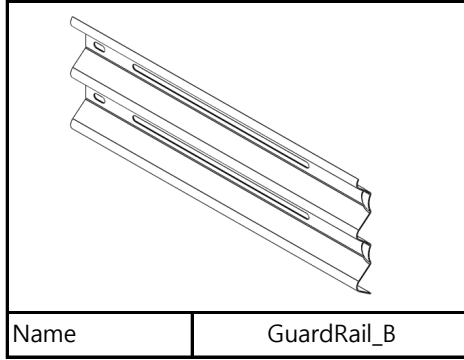
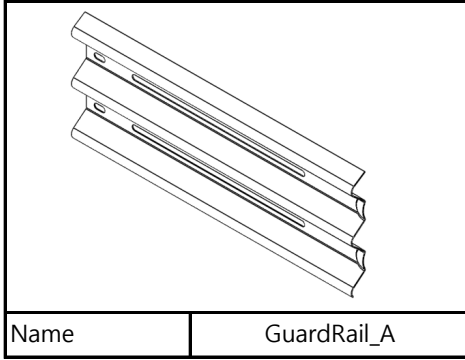
CC80km/h



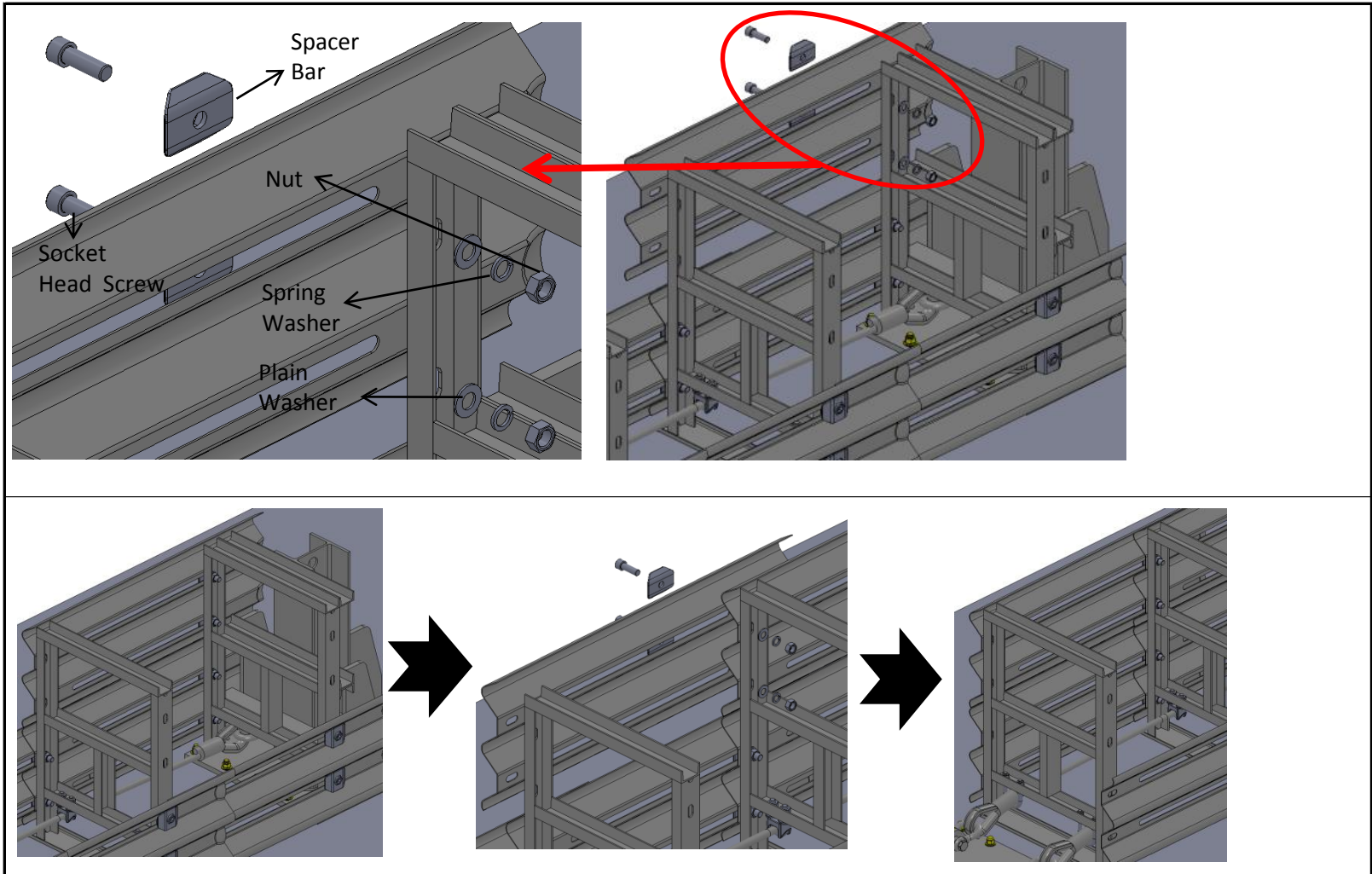
CC50km/h



▣ Assembly Step 8-3[Setting of GuardRail\_A and GuardRail\_B]



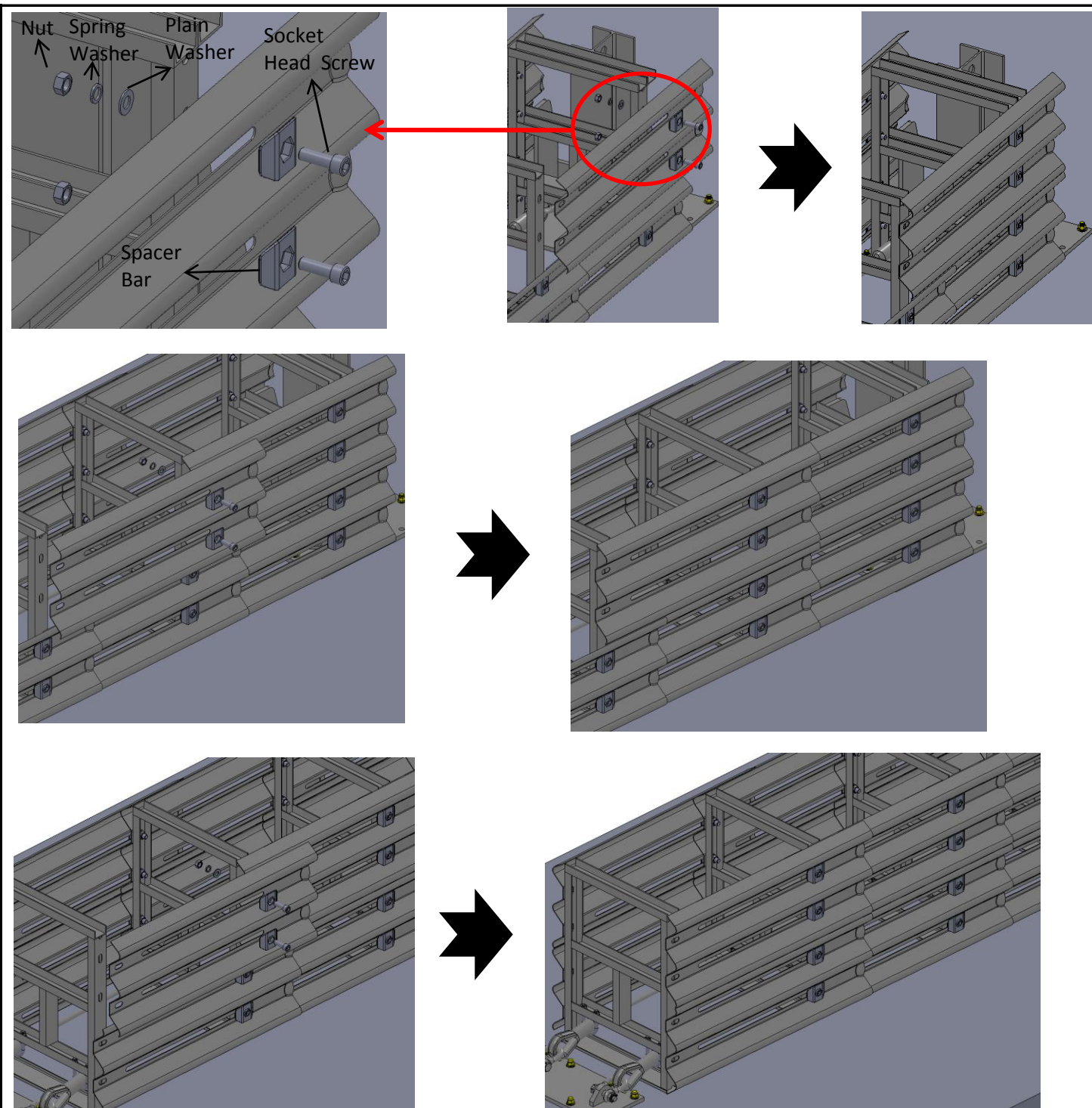
□ Assembly Step 8-3-1[Setting of GuardRail\_B]



□ Explanation

1. Assemble GuardRails in order from the Back Stop Frame to Front Frame
  2. Connect the GuardRail with the frame with Spacer Bar, Plain Washer, Spring washer and Nut(M20)
  3. The joint of Socket Head Screw and Nut should be temporary at this moment
- ★The assembly of Front Frame and Guard rail\_C should be assembled with Front sheet after the assembly of Guard rail\_(A,B)

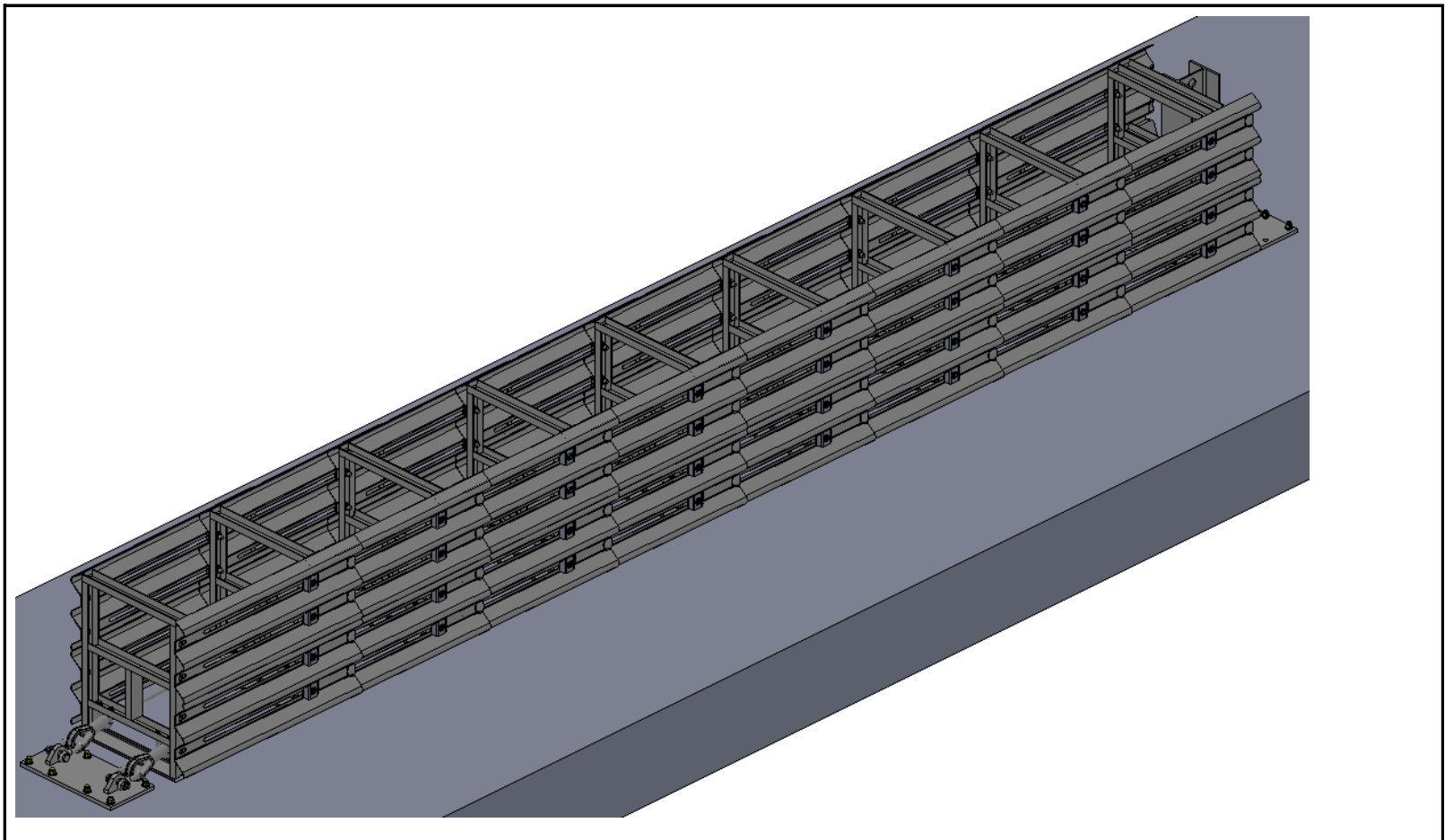
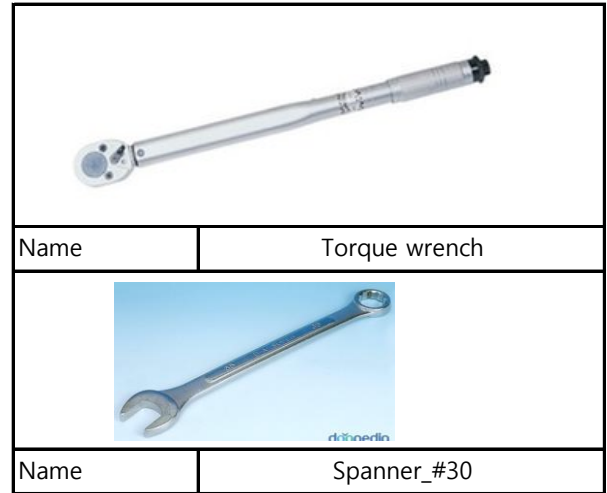
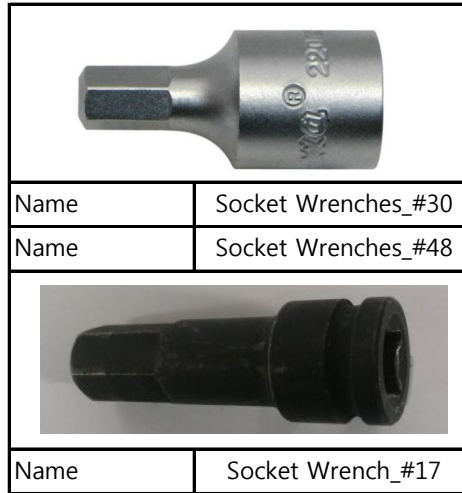
□ Assembly Step 8-3-2[GuardRail\_B Temporary-Assembly]



□ Explanation

1. Assemble GuardRails in order from the Back Stop Frame to Front Frame
  2. Connect the GuardRail with the frame with Spacer Bar, Plain Washer, Spring washer and Nut(M20)
  3. The joint of Socket Head Screw and Nut should be temporary at this moment
- ★The assembly of Front Frame and Guard rail\_C should be assembled with Front sheet after the assembly of Guard rail\_(A,B)

□ Assembly Step 8-4[Setting of GuardRail\_A and B]



□ Explanation

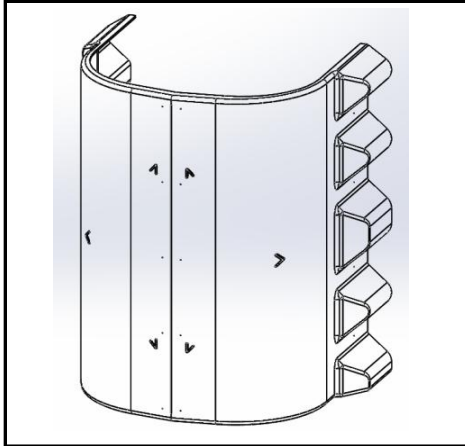
1. Assemble completely using the Impact Driver with Socket Wrench\_#17 in order to complete the assembly of Guard rail\_B/A

2. Finish up the bolted joints using Torque wrench

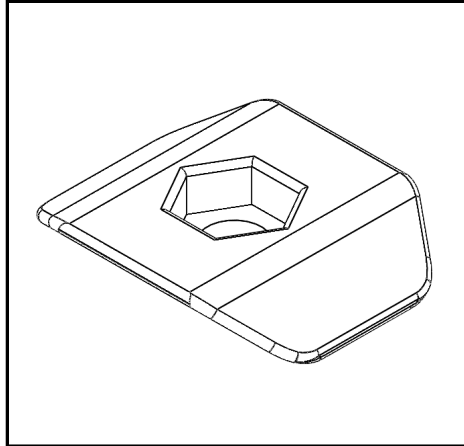
(Fix the Nut jointed on the bottom of Frame using Spanner\_#30

☞ See Table-1) for the value of guardrail screwing torque

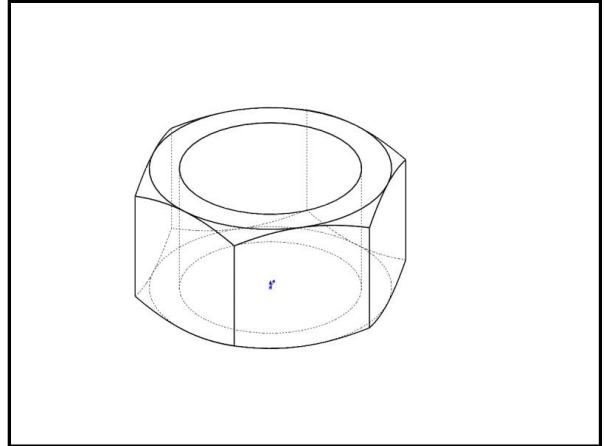
□ Assembly Step 9[Assembly of Front sheet]



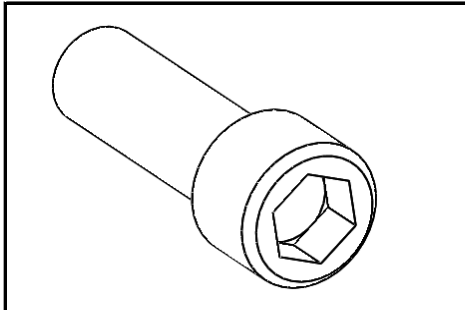
|      |             |
|------|-------------|
| Name | Front Sheet |
|------|-------------|



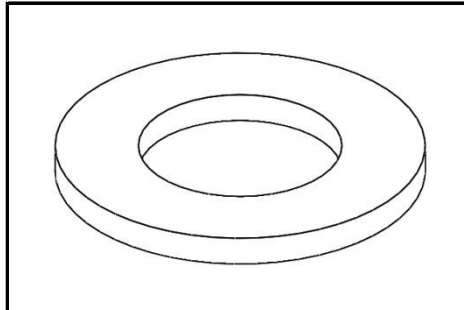
|      |            |
|------|------------|
| Name | Spacer Bar |
|------|------------|



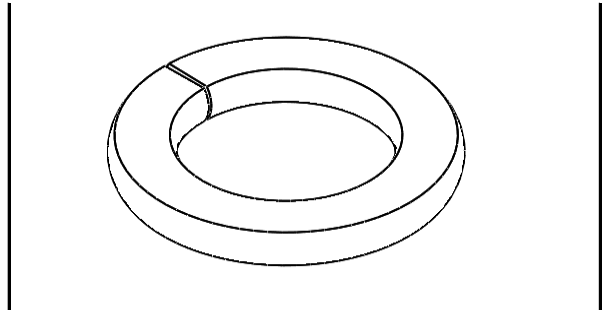
|      |                 |
|------|-----------------|
| Name | Hexagon Nut_M20 |
|------|-----------------|



|      |                   |
|------|-------------------|
| Name | Socket Head Screw |
|------|-------------------|



|      |                  |
|------|------------------|
| Name | Plain Washer_#21 |
|------|------------------|



|      |                   |
|------|-------------------|
| Name | Spring washer_#21 |
|------|-------------------|



|      |               |
|------|---------------|
| Name | Impact Driver |
|------|---------------|



|      |                     |
|------|---------------------|
| Name | Socket Wrenches_#30 |
|------|---------------------|

|      |                     |
|------|---------------------|
| Name | Socket Wrenches_#48 |
|------|---------------------|



|      |                   |
|------|-------------------|
| Name | Socket Wrench_#17 |
|------|-------------------|

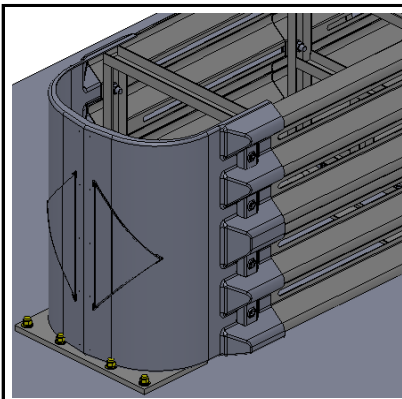
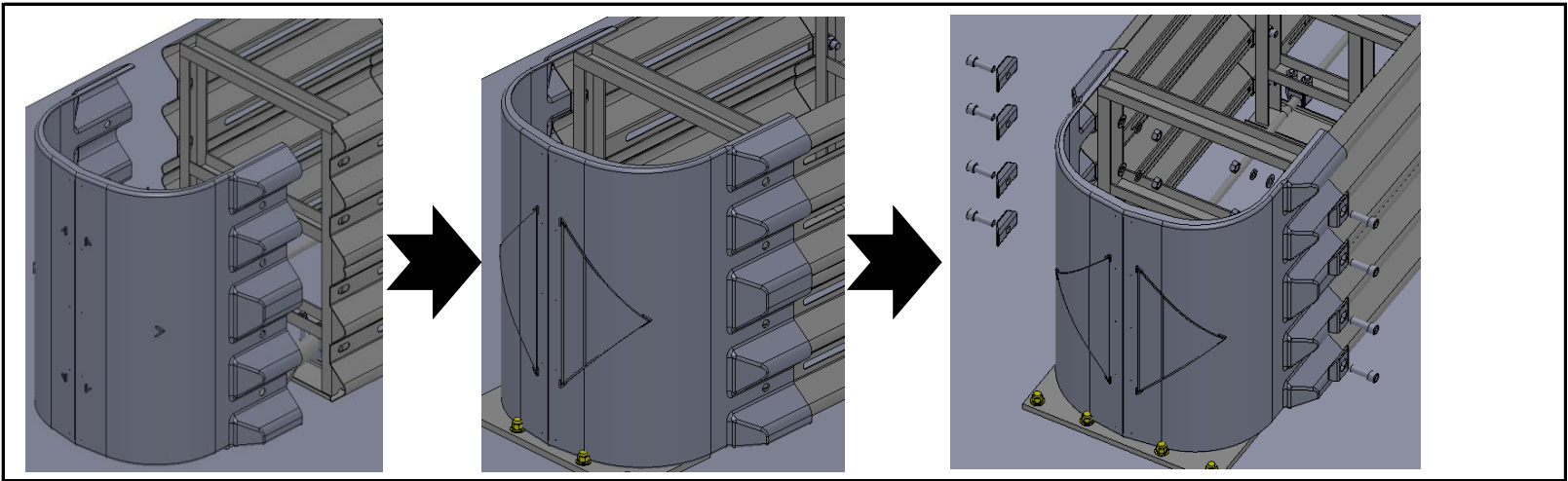


|      |               |
|------|---------------|
| Name | Torque wrench |
|------|---------------|



|      |             |
|------|-------------|
| Name | Spanner_#30 |
|------|-------------|





□ Explanation

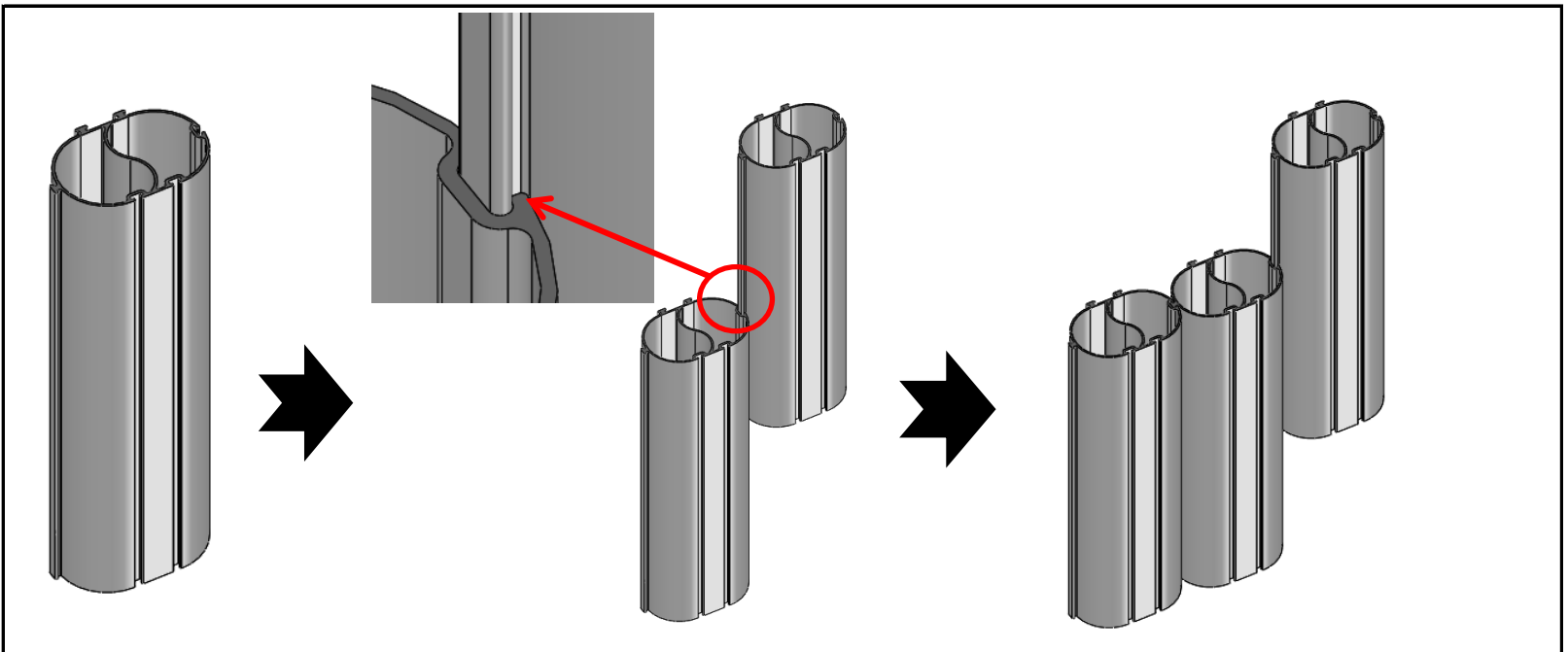
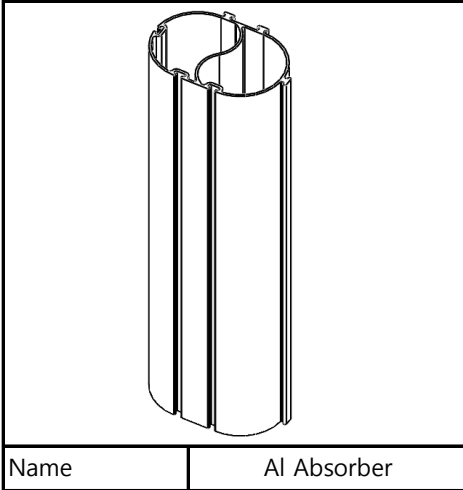
1. Put Front Sheet into Guardrail\_A/B/C as seen in the picture above

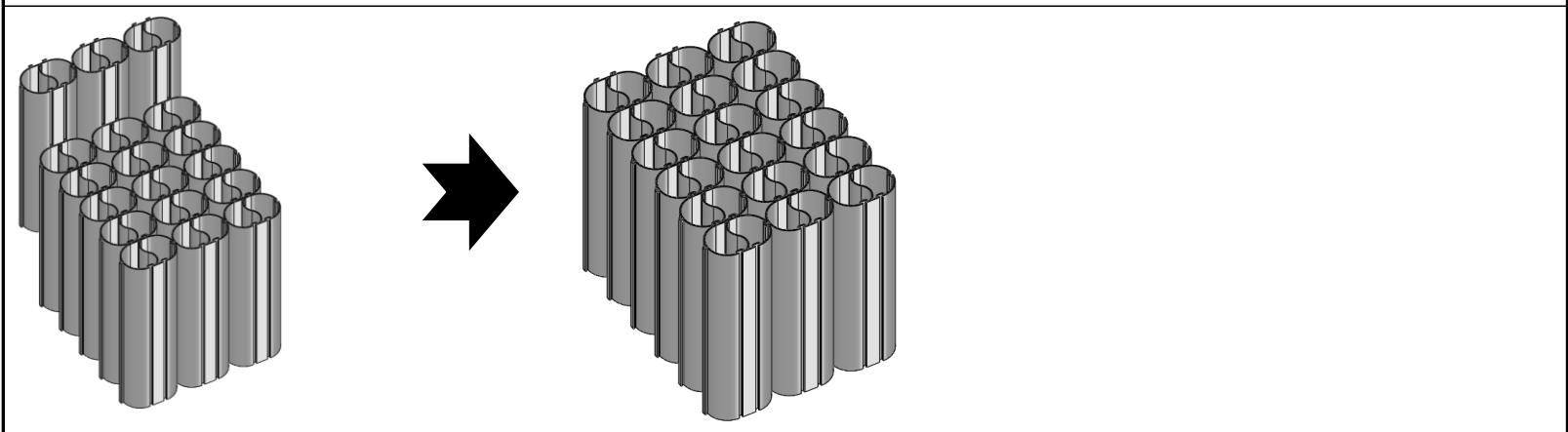
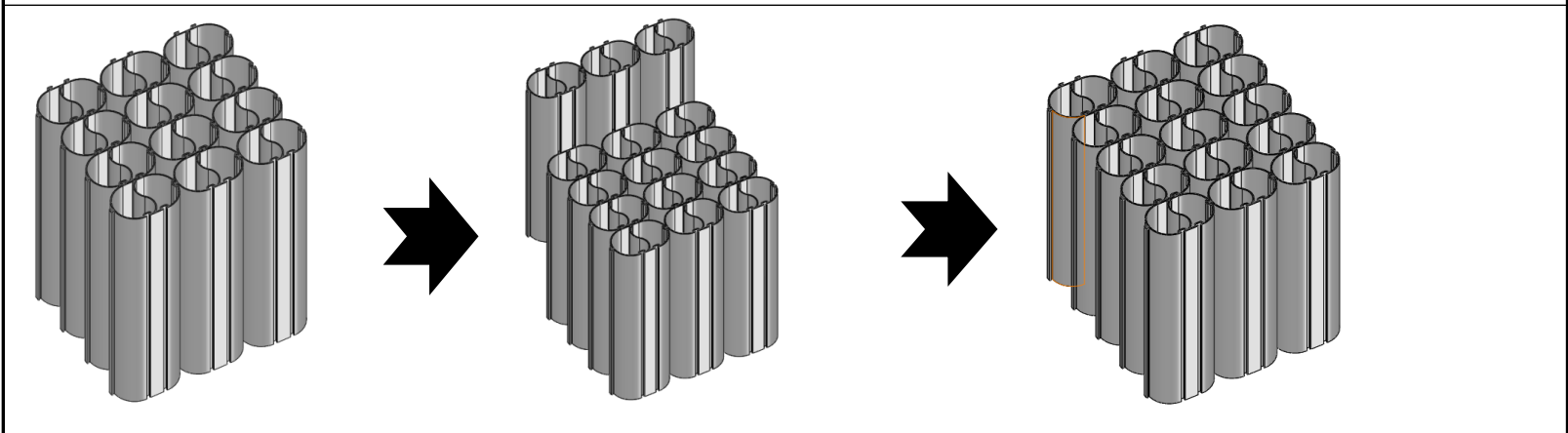
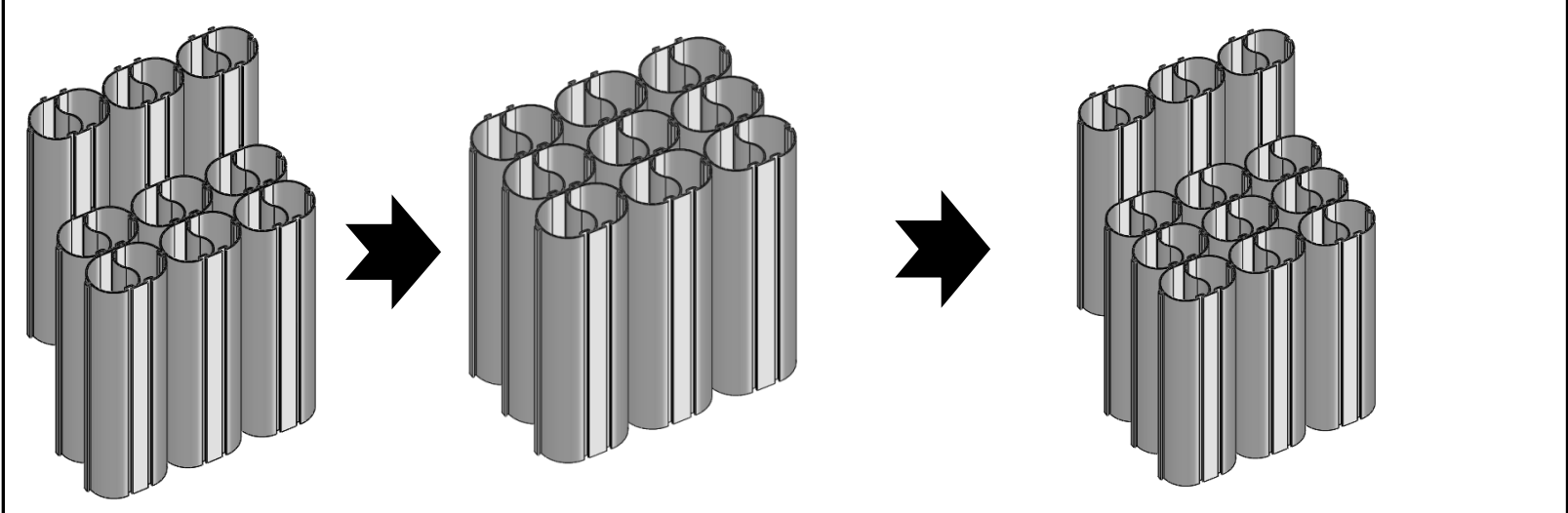
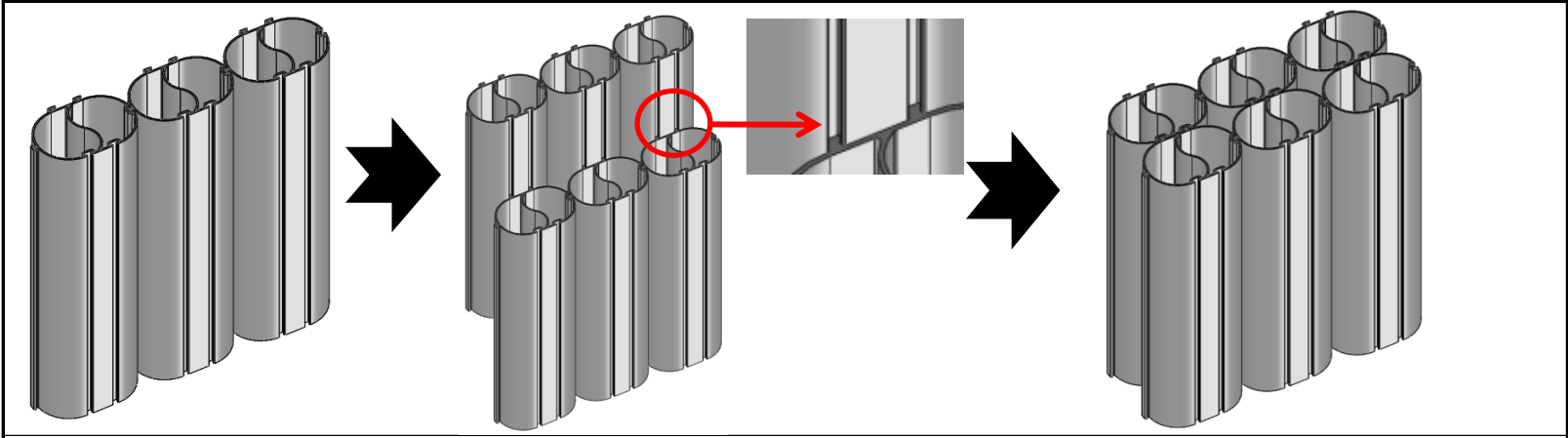
2. Use Spacer bar , Socket bolt , Plain washer , spring washer and Nut to connect Front sheet with Front Frame

(☞ See Table-1) for the torque value of Bolts and nuts

(Fix Nuts on the back of Fram not to spin using Spanner\_#30

□ Assembly Step 10[Assembly of AI Absorber]



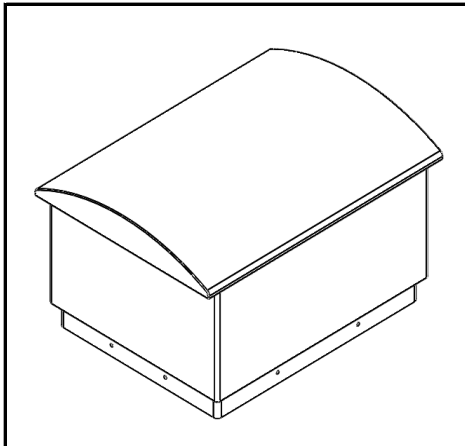


□ Explanation

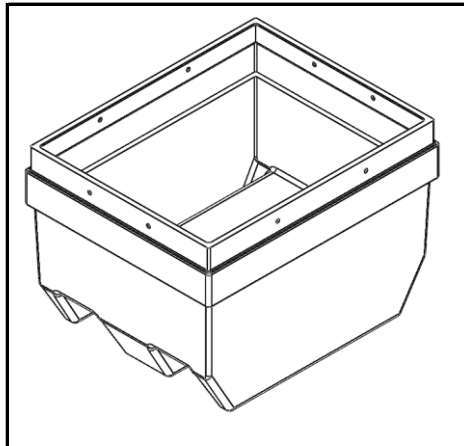
1. Assemble AI absorbers gradually as seen in the picture above

2. AI absorber\_assembly is only for CCS100km and CCS110km

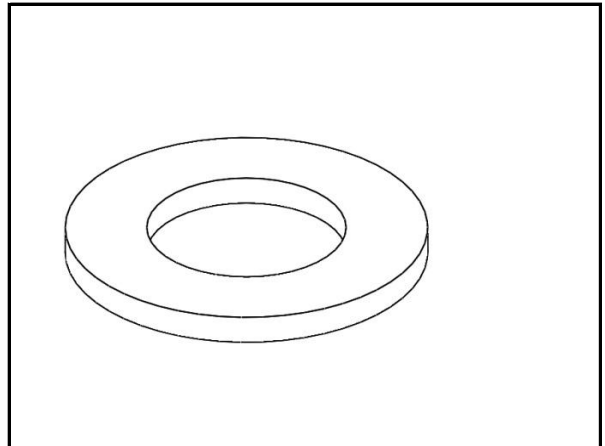
□ Assembly Step 10-1[Assembly of Middle Tank\_without AI absorber]



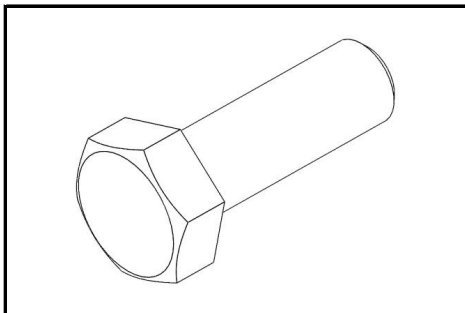
Name Middle Tank\_Top



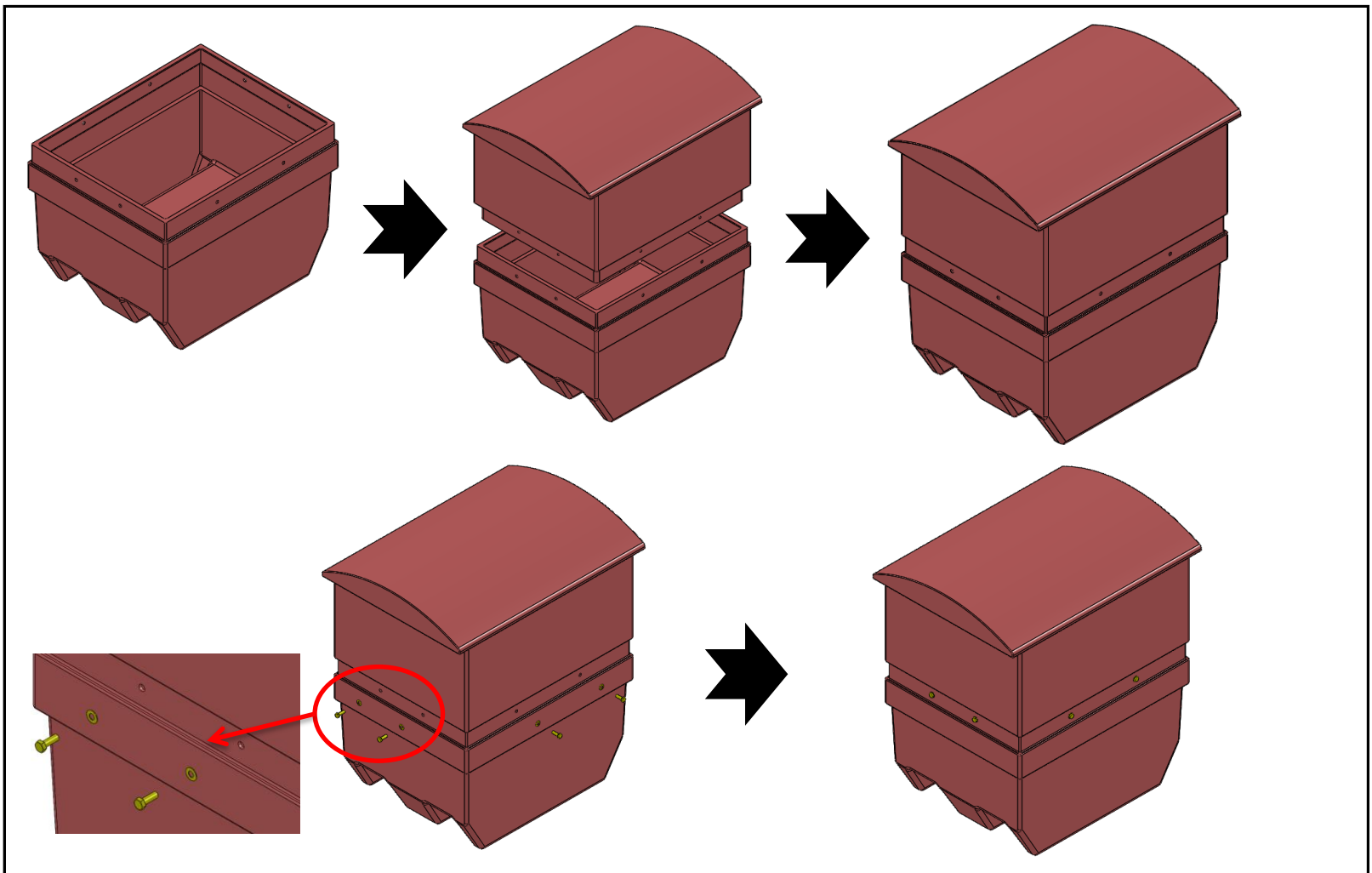
Name Middle Tank\_Bottom



Name Plain Washer\_#10

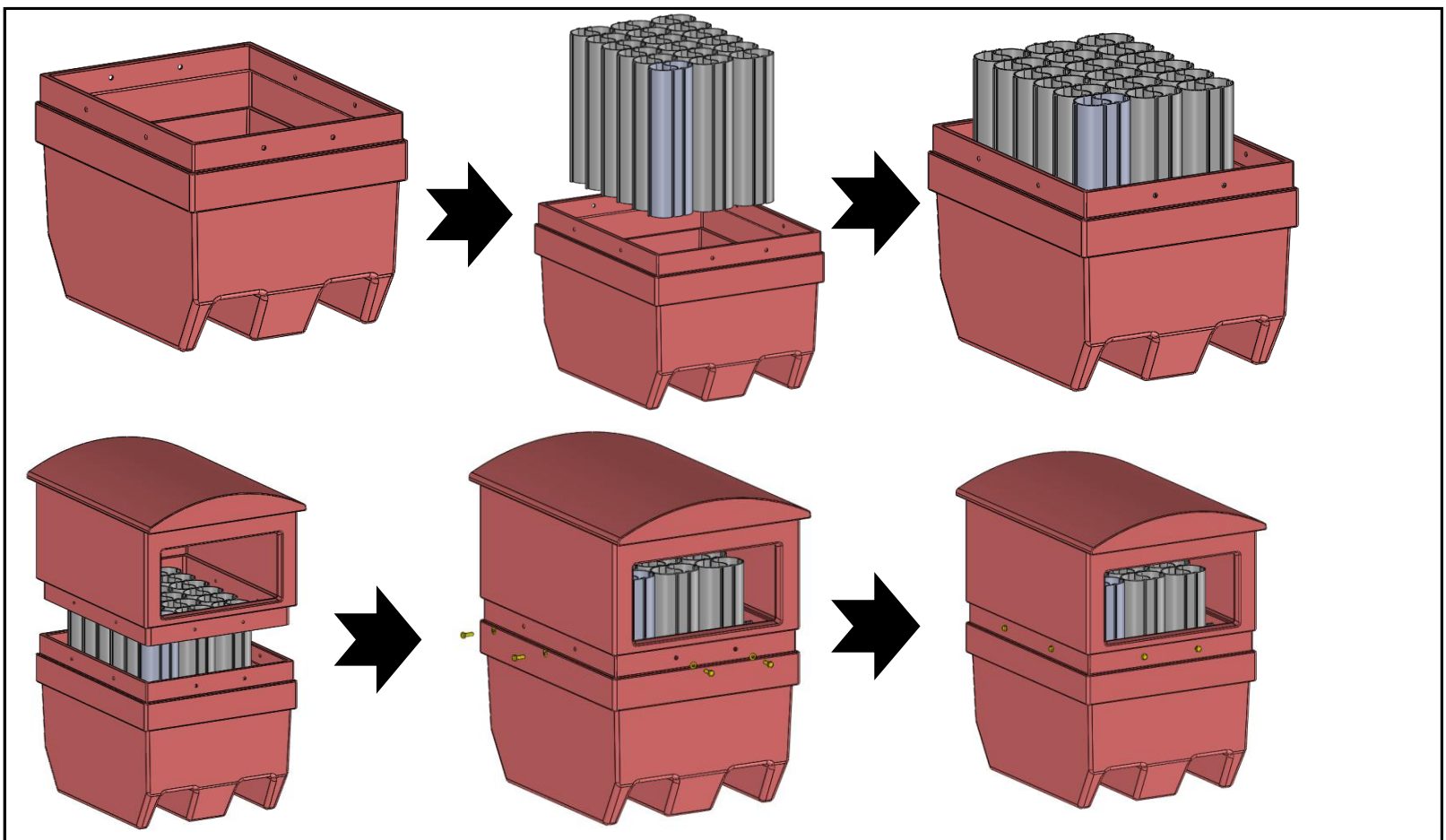
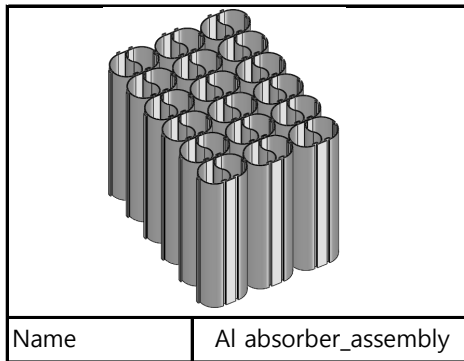
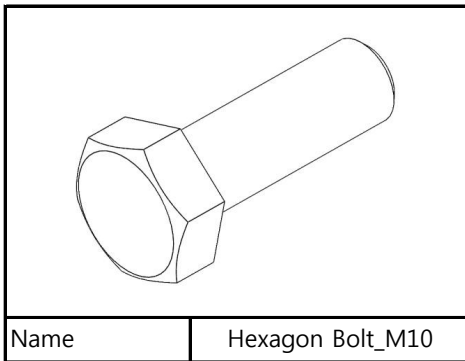
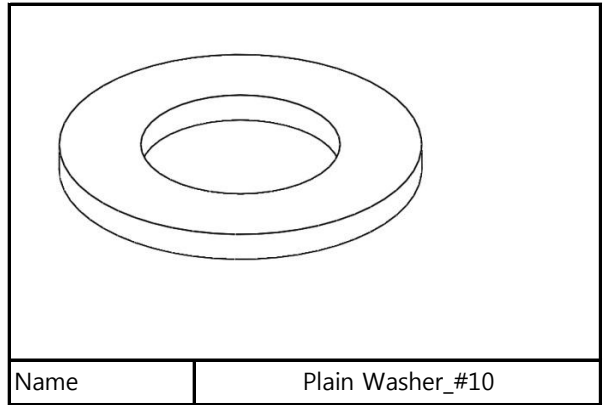
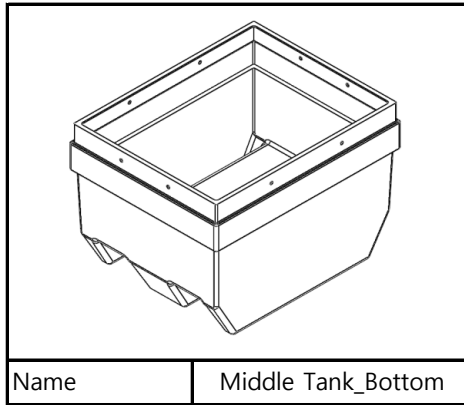
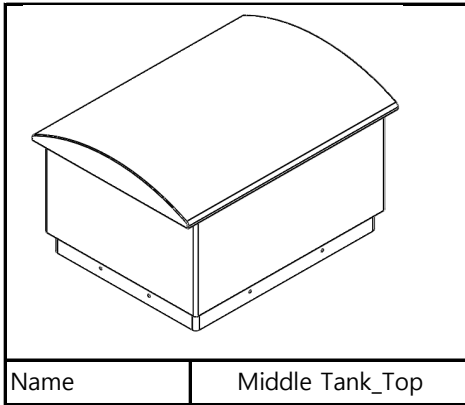


Name Hexagon Bolt\_M10



□ Explanation  
1. Put Middle Tank\_Top into Middle Tank\_Bottom, and complete the assembly with Plain washer and Bolt

▣ Assembly Step 10-2[Assembly of Middle Tank\_with Al absorber\_assembly]

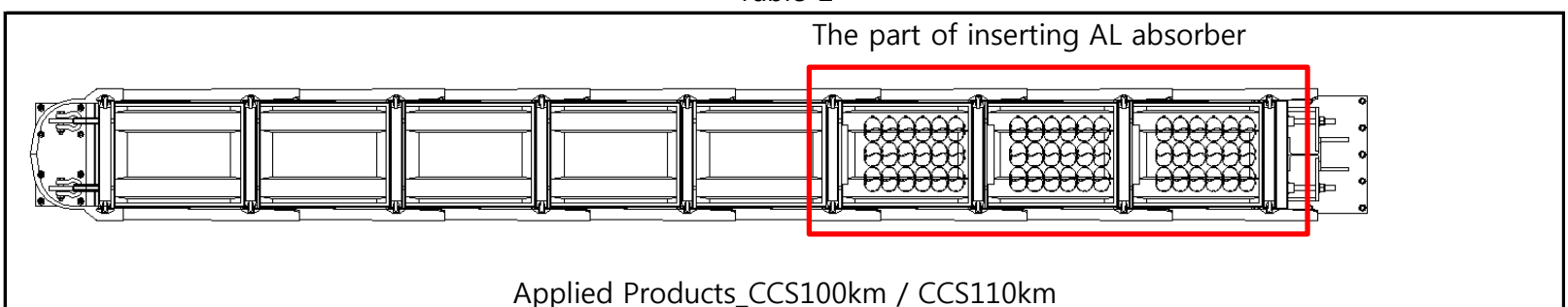


▣ Explanation

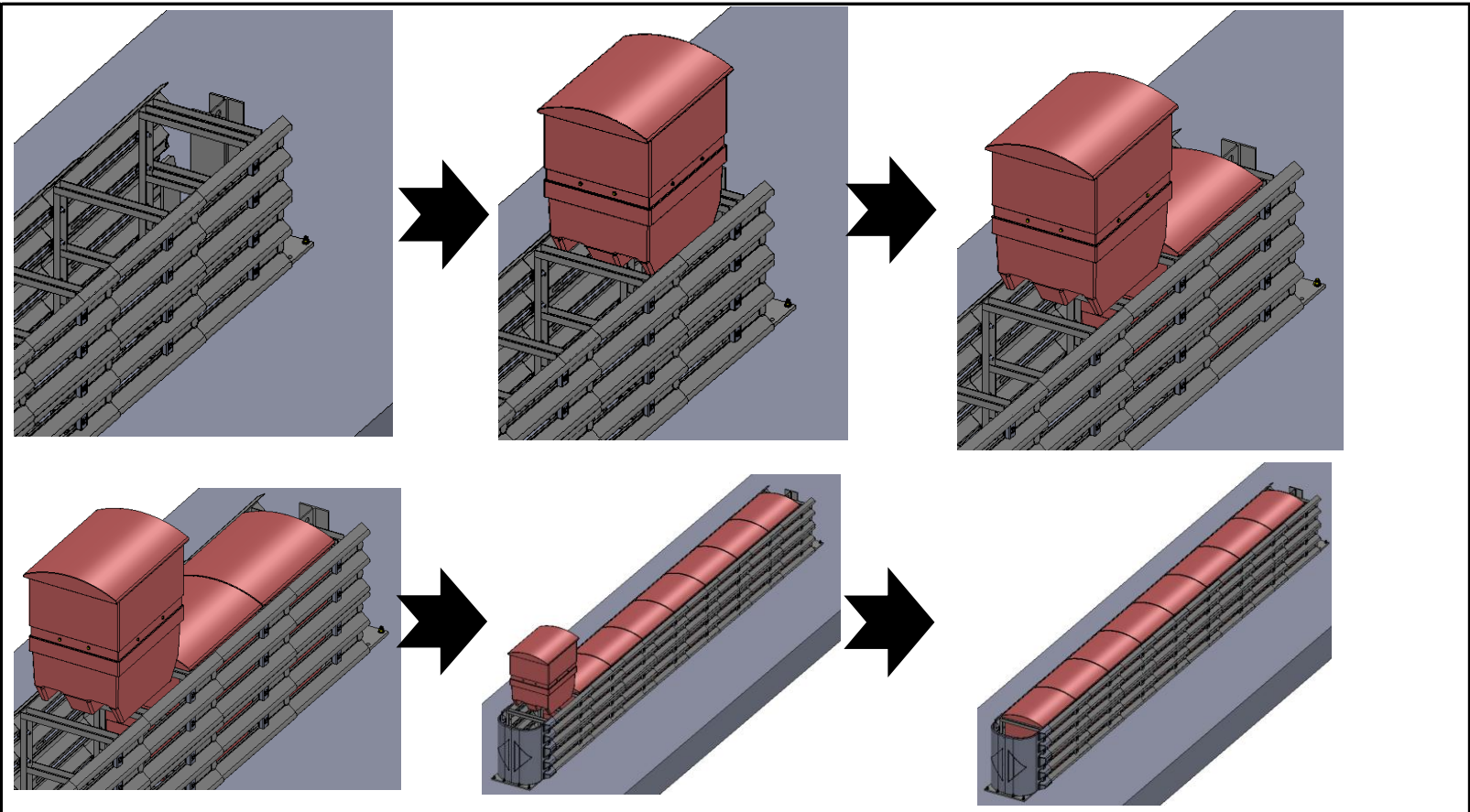
1. Insert Al absorber\_assembly into Middle Tank\_Bottom, and then put Middle Tank\_Top together
2. Complete the assembly of Middle Tank\_Bottom and Middle Tank\_Top with Plain washer and Bolt

◆ The components above are only for CCS100km / CCS110km [See Table-2 for the applicable status]

Table-2



□ Assembly Step 11[Assembly of Middle Tank assembly]



□ Explanation

1. Assemble Middle Tank\_assembly in the direction from Back stop to Front Frame

◆ CCS100/110km: Middle Tank should be transported and inserted into Frame in a group of two workers as as there is Al absorber in Middle Tank\_assembly