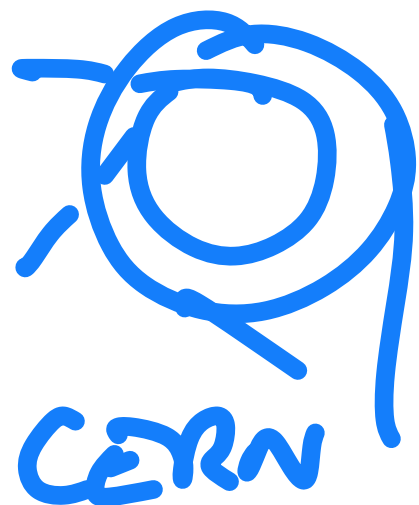


ASSEMBLY GUIDE FOR PRO-ANUBIS SUPPORT STRUCTURE.

C.G. LESTER

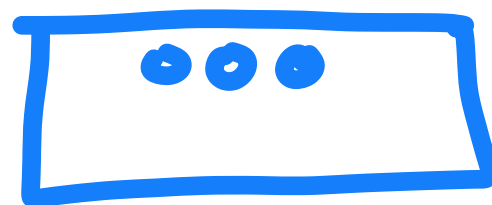


UNIVERSITY OF
CAMBRIDGE

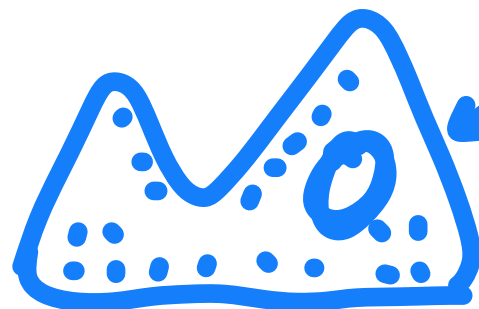
JANUARY 2023

Don't PANIC

Parts:

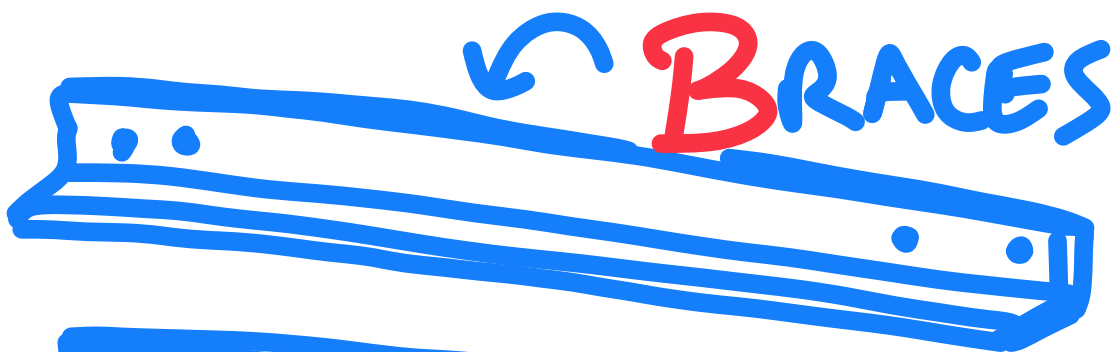


FLOOR **P**lates (x4)



MOUNTAINS (x2)

{ USA15 mountain
US15 mountain



BRACES (x4)

{ 3A-6A5A
3B-6B5B
8A7A-2A
8B7B-2B

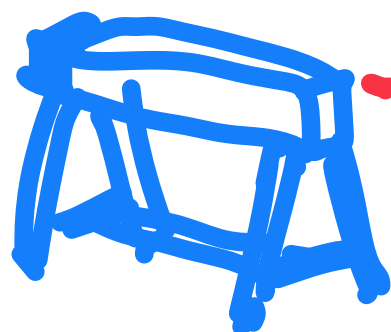


LONG **X**-BRACE (x2)



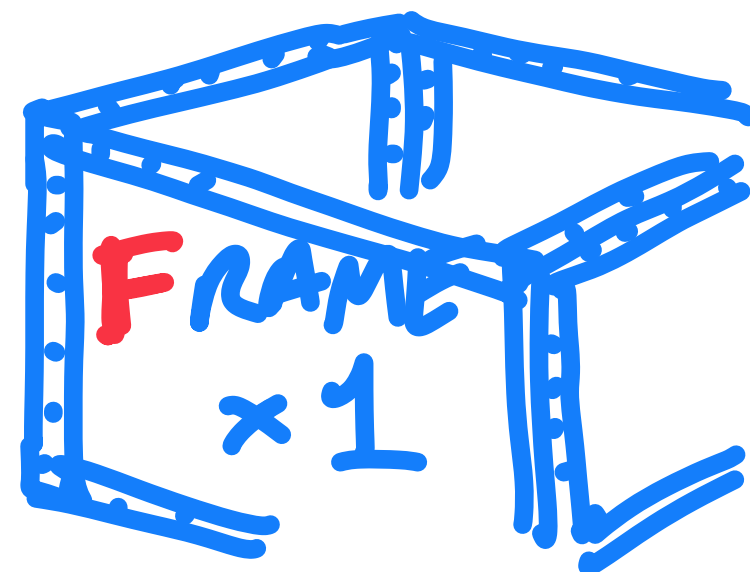
SHORT **X**-BRACE (x2)

↑
"Cross"-BRACE



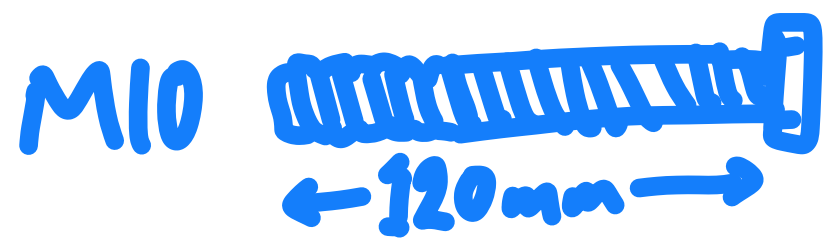
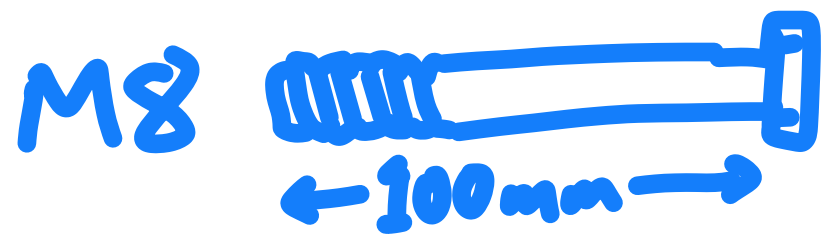
TRESTLES (x2)

{ USA15 Trestle
US15 Trestle



Frame
x1

MORE PARTS:



Frame
✓ to Mountain

"FM BOLTS" (x16) + spares

"MT BOLTS" (x16) + spares

↑ Mountain to Trestle

"TB BOLTS" (x16) + spares

↑ Trestle to Brace

"X-BOLTS" (x8) + spares

↑ Cross Bracing Bolts

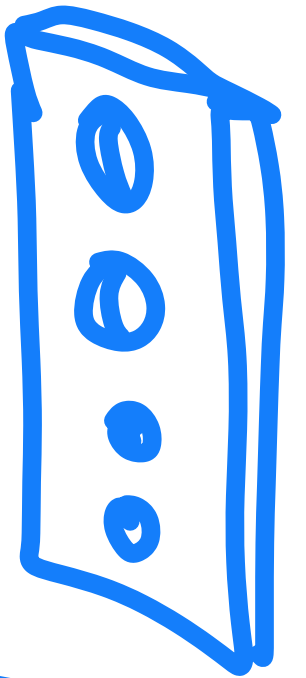
MORE PARTS:

8 in Cross-Bracing connections
16 in FM connections
16 in TB connections

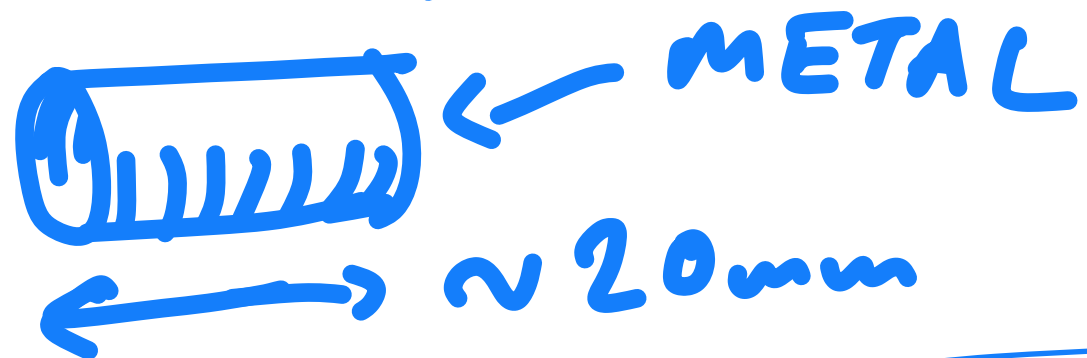
- SMALL M8 WASHERS @ (x 40) + spares
- SMALL M10 WASHERS @ (MANY!!)
- BIG M10 WASHERS @ (x 8) + spares
(ONLY USED IN TIE DOWNS)
- LARGE M8 WASHERS @ (x 48) + spares
(ALL FOR FRAME-MOUNTAIN CONNECTIONS)
- M8 NUTS (x 40) + SPARES
8 in cross-bracing connections
16 in FM connections
16 in TB connections.
- M10 NUTS (x 32) + SPARES
16 in TIE DOWNS
16 in MT connections

MORE PARTS:

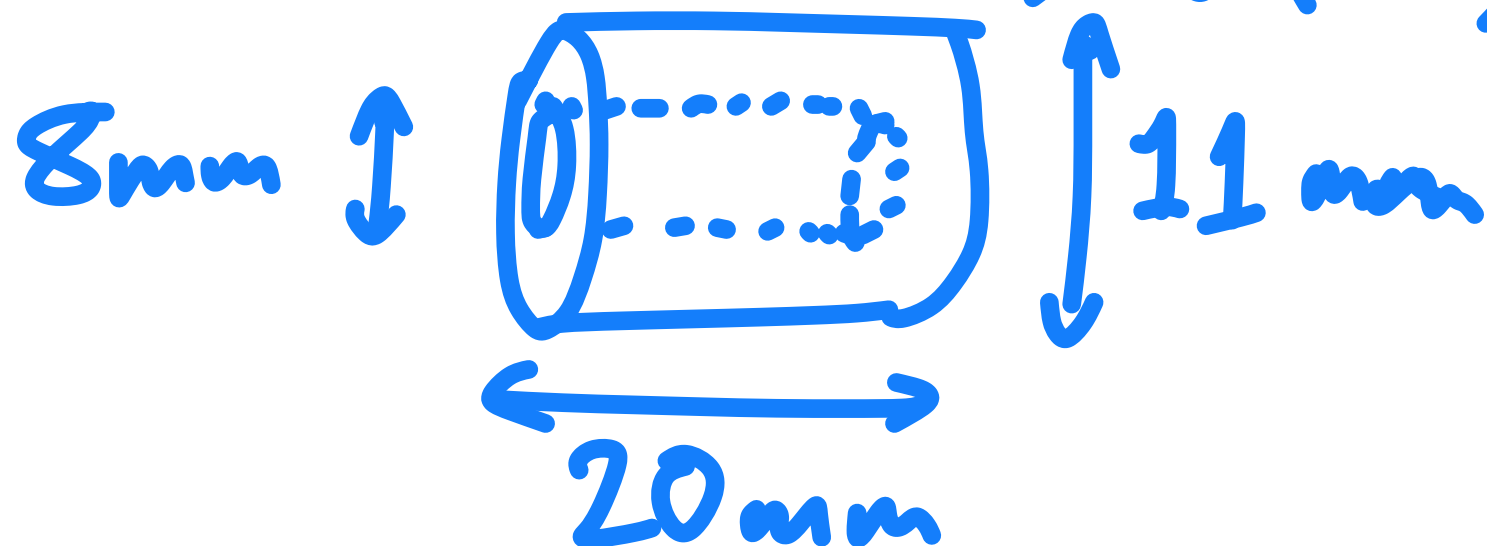
ALUMINIUM CLAWS (x 8) { 5A, 6A, 7A, 8A, 5B, 6B, 7B, 8B }



OLEG SPACERS ($\times 16$) + SPARES



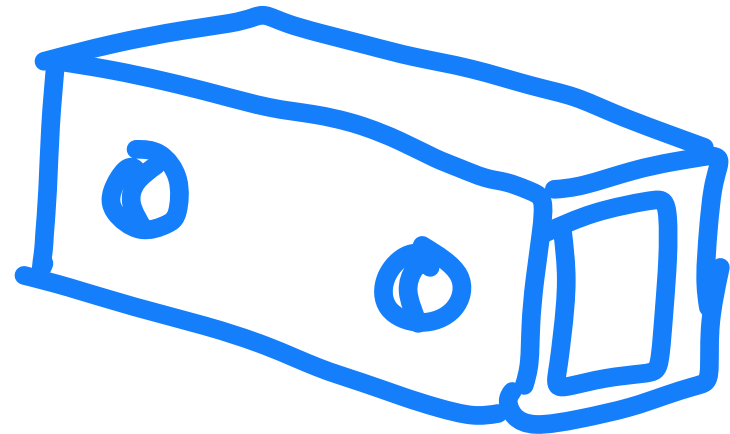
20mm SECTIONS PLASTIC TUBING (x16) + SPARES



MORE PARTS:

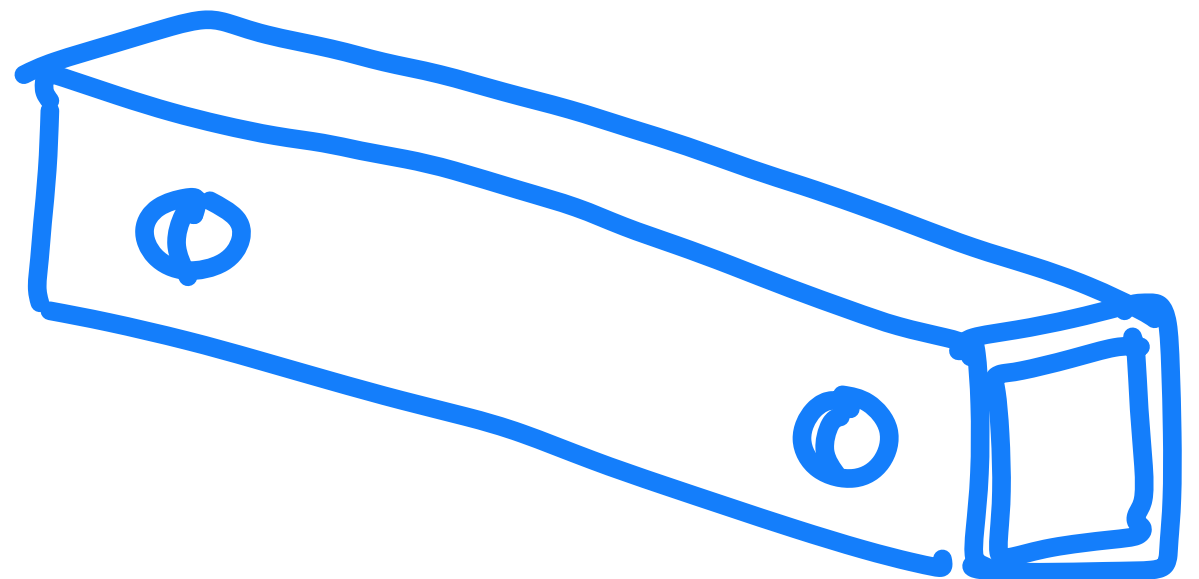
SHORT BOX (x4) { 2A, 3A, }
SECTIONS { 2B, 3B }

(Approx 90mm x 25mm x 25mm)



LONG BOX (x4) { 8A7A, 6A5A }
SECTIONS { 8B7B, 6B5B }

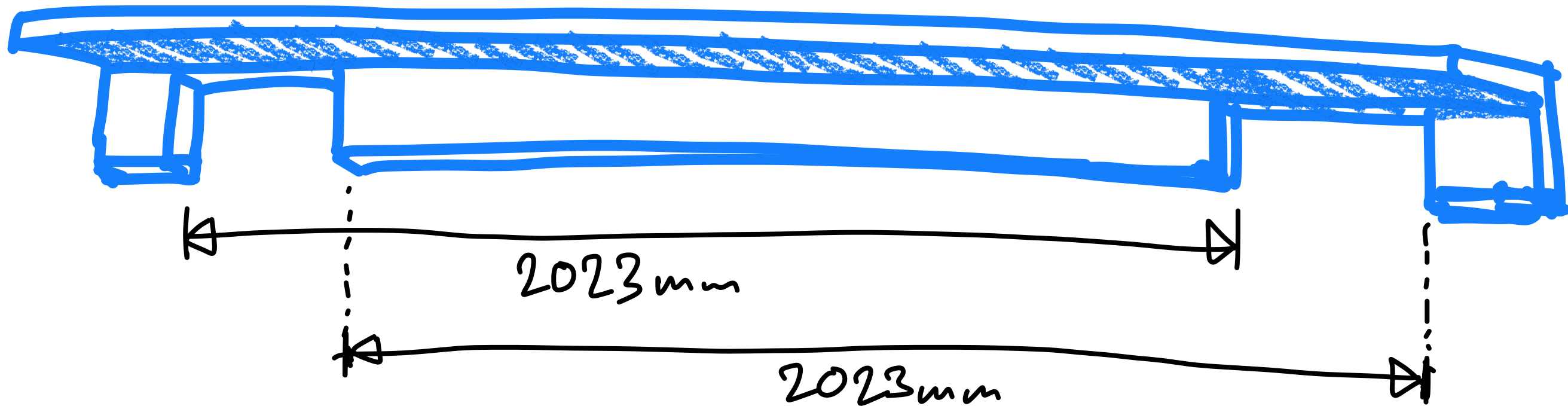
(Approx
160mm x 25mm x 25mm)



MORE PARTS:

SPACING JIGS (x2)

(ONLY USED DURING ASSEMBLY — THEN REMOVED)



COORDINATES / ORIENTATION

INTERACTION
POINT

B SIDE (ANUBIS)
=

C SIDE (ATLAS)
=

FRONT

BACK

US 15 SIDE

USA 15 SIDE



FLOOR PLATE

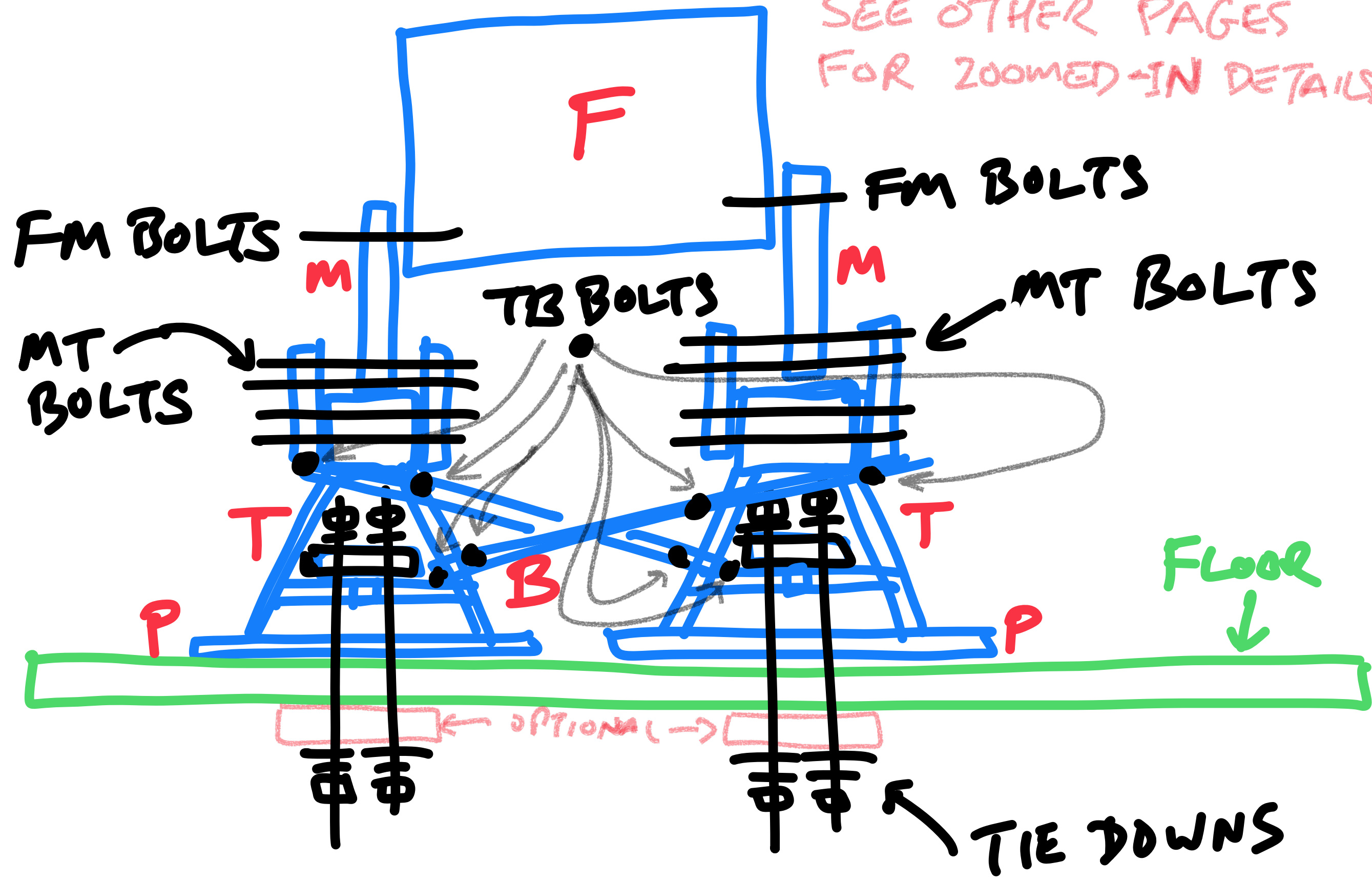
A SIDE (ANUBIS)
=

A SIDE (ATLAS)



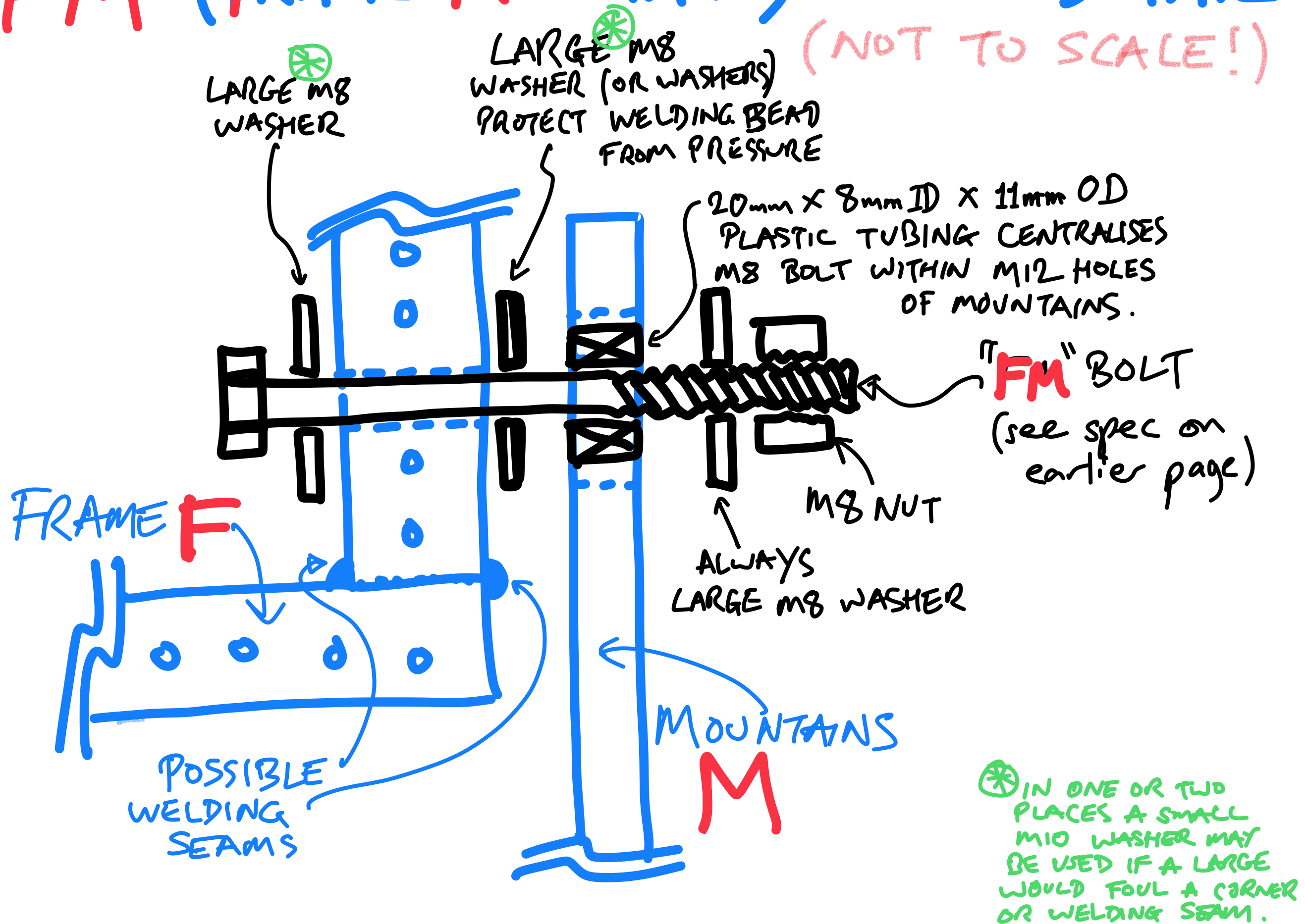
OVERVIEW OF BOLTED CONNECTIONS

SEE OTHER PAGES
FOR ZOOMED-IN DETAILS

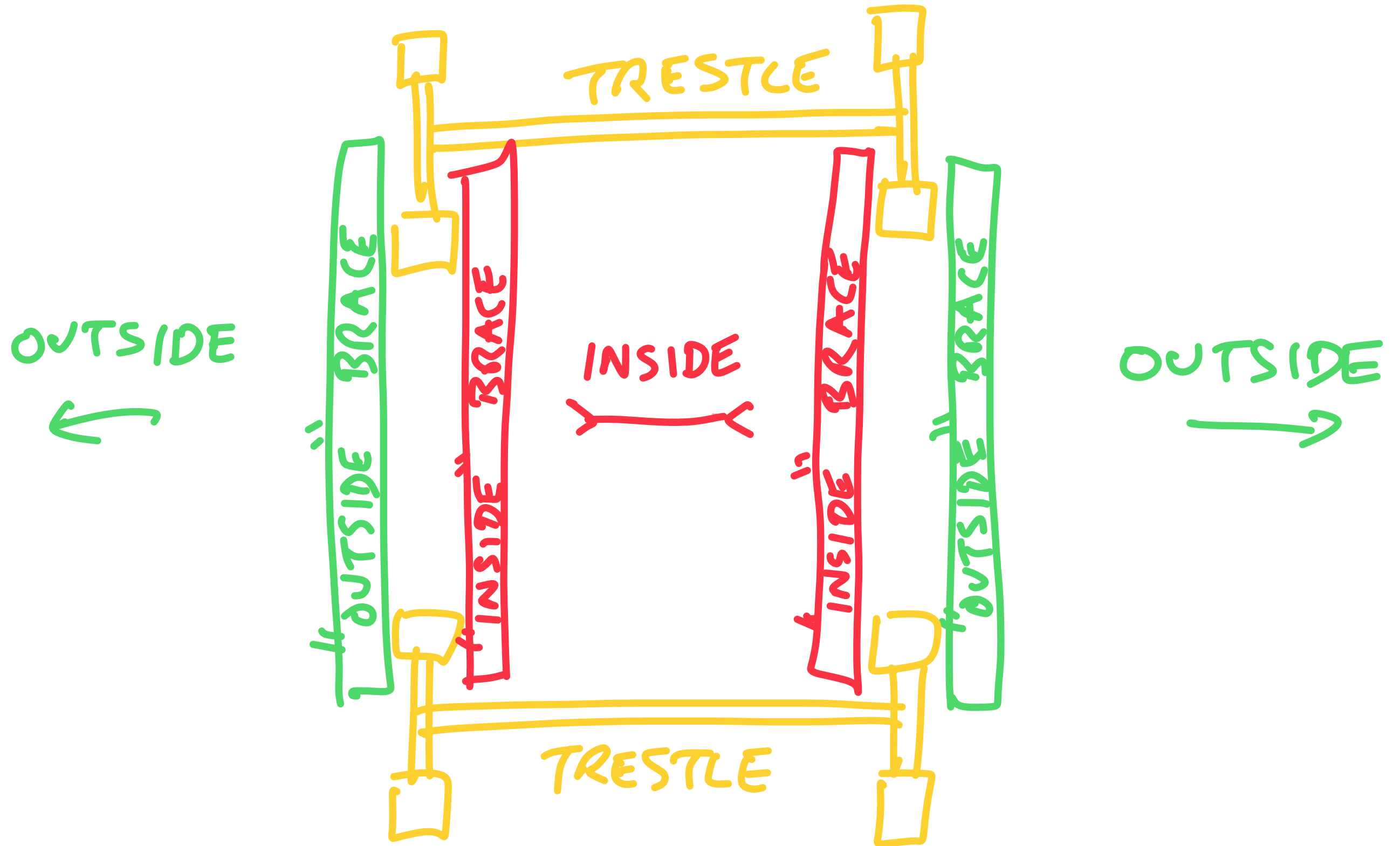


F_M (FRAME-MOUNTAIN) CONNECTION DETAIL

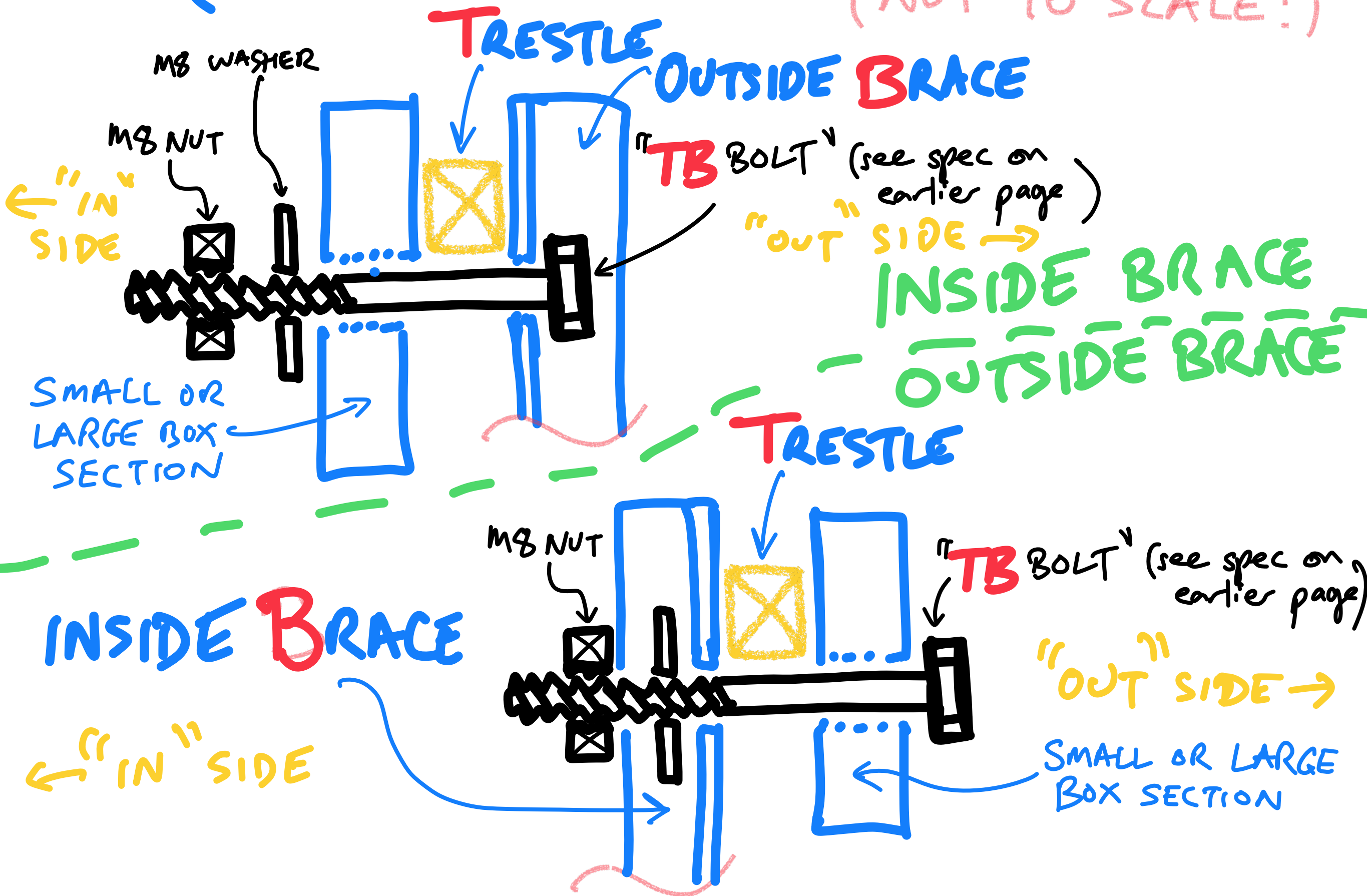
(NOT TO SCALE!)



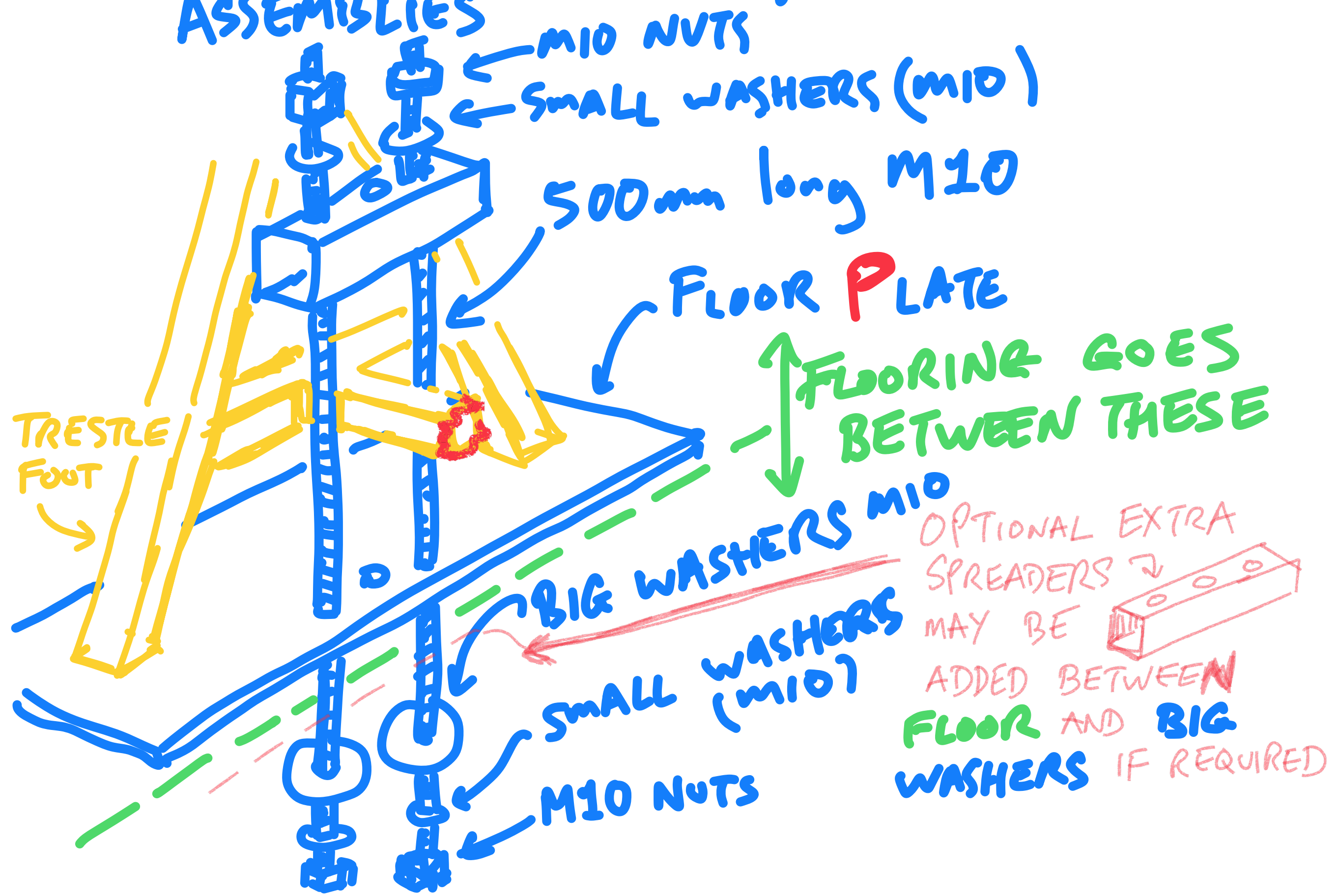
INSIDE VS OUTSIDE BRACES



TB (TRESTLE-BRACE) CONNECTION DETAIL (NOT TO SCALE!)



TIE-DOWNS (x4) + spares: ASSEMBLIES



MT (MOUNTAIN-TRESTLE) CONNECTION DETAIL

MOUNTAIN

SUFFICIENT MID WASHERS
TO PACK OUT SPACE
BETWEEN CLAWS

"MT" BOLTS
(see spec on
earlier page)

OLEG
SPACERS

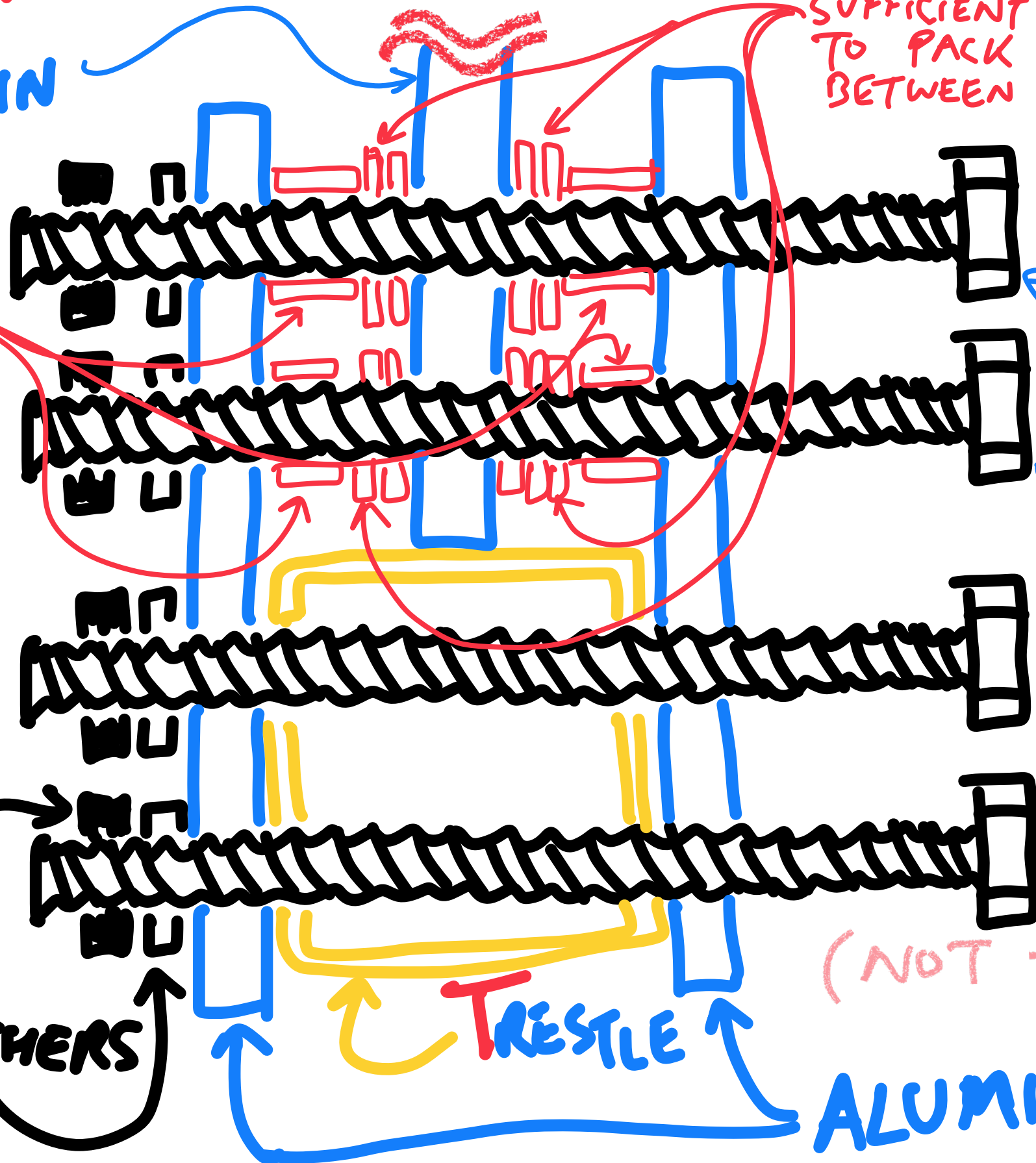
MID
NUTS

SMALL
MID WASHERS

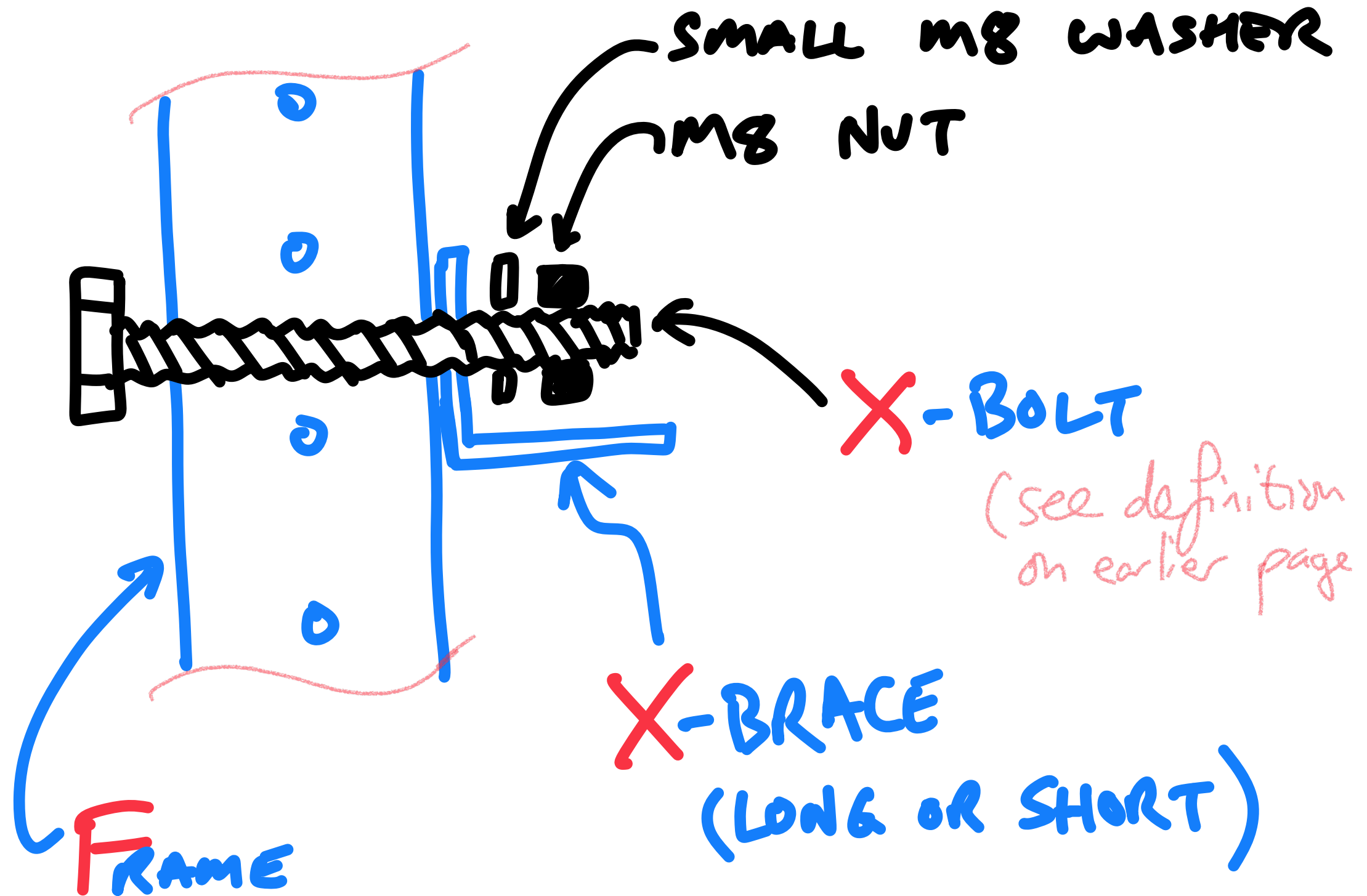
TRESTLE

(NOT TO SCALE!)

ALUMINIUM
CLAWS



X-BRACE CONNECTION DETAIL



ASSEMBLY ORDER

STEP 1A

ATTACH
MOUNTAINS TO
FRAME

STEP 1B

PREPARE TRESTLE
SUPPORT STRUCTURE
ON BALCONY

STEP 2

MOUNT FRAME
ONTO TRESTLES.

(MORE DETAIL IN
NEXT FEW PAGES)

ASSEMBLY STEP (1A)

*SMALL IF OCCLUDED

1A.1

RAISE FRAME ≥ 50 CM ABOVE GROUND

1A.2

PUT A LARGE* WASHER ONTO EACH
FM BOLT AND INSERT ALL 16
THROUGH APPROPRIATE FRAME
HOLES FROM INSIDE TO OUTSIDE

1A.3

ADD ADDITIONAL "EXTERNAL" LAYER OF
LARGE* WASHERS IF WELD SEAMS NEED
PROTECTING [EXPECTED].

1A.4

SUSPEND MOUNTAIN IN VERTICAL
ORIENTATION AND ATTEMPT TO FIT
TO PROTECTING BOLTS... ADD PLASTIC
TUBING SLEEVES DURING THIS STEP
TO KEEP MOUNTAINS IN GOOD POSN.

SEE PHOTO
AT END OF
DOCUMENT
SHOWING
CORRECT
ORIENTATION

(SLEEVES MAY NEED TAPPING IN WITH HAMMER
AND AN ANNULAR TOOL OF SOME KIND)

SLEEVES CAN BE OMITTED IF
TOLERANCES PREVENT THEIR
INSERTION... BUT TRY HARD
AS DESIGN IS MUCH SAFER
WITH THEM IN! 😊

ASSEMBLY STEP (1A) (CONTINUED)

1A.5 AFTER GETTING ALL BOLTS THROUGH, ADD FINAL SET OF LARGE WASHERS AND NUTS AS SHOWN IN FM CONN DIAG AND TIGHTEN.

1A.6 REPEAT 1A.4 & 1A.5 FOR OTHER MOUNTAIN

1A.7 FIT TEMPORARY CROSS BRACING TO FRAME ENDS WHILE FRAME IS STILL LEVEL (OTHERWISE DISTORTION DUE TO GRAVITY WILL MAKE IT DIFFICULT TO FIT LATER!)

AS SHOWN
IN "X-BOLT
CONNECTION
DETAIL"
DIAGRAM
EARLIER

LOCATION OF CROSS BRACES IS SHOWN IN DIAGRAM NEAR DOCUMENT END.

USE X-BOLTS FOR THIS WITH NUT AND SMALL WASHER (M8).

ASSEMBLY STEP (1A) (CONTINUED)

1A.8 LOWER FRAME TO GROUND WITH
WEIGHT TAKEN BY EITHER
MOUNTAINS OR FRAME, AS DESIRED.

— END —

ASSEMBLY STEP (1B)

1B.1: PLACE FLOOR PLATES ON GROUND AND TRESTLES ON TOP, THEN USE THE TWO SPACING SIGS TO LOCATE THE TRESTLES AT CORRECT 2023mm SPACING.

1B.2: ATTACH INSIDE & OUTSIDE BRACES AS SHOWN IN TB CONN DIAG. YOU CAN ALSO USE APPENDIX PHOTOS AS GUIDE.

(NOTE SOME BOLTS ARE WRONG WAY ROUND IN SOME PHOTOS. PREFER ORIENTATION FROM DIAGS HERE)

1B.3: SLIDE WHOLE ASSEMBLY AND/OR FLOOR-PLATES AROUND UNTIL HOLES IN FLOOR-PLATES, HOLES IN FLOOR AND TRESTLE CROSS BARS ALLOW INSTALLATION OF TIE-DOWNS. INSTALL TIE-DOWNS.

1B.4: REMOVE SPACING SIGS AND INSTALL CLAWS
END

SEE BOTTOM HALF OF
MT-CONN DIAGRAM

ASSEMBLY STEP ②

- 2.1 : BRING **F**FRAME TO CRANE AREA ABOVE PIT AND ENSURE **F**FRAME IS TILTED OVER (I.E.: STANDING ON ITS **M**OUNTAINS).
- 2.2 : LOWER **F**FRAME INTO PIT, USING CANTILEVER ADAPTOR ON CRANE SO THAT THE LANDING POINT IS ON THE PRE-PREPARED **T**TRESTLES.

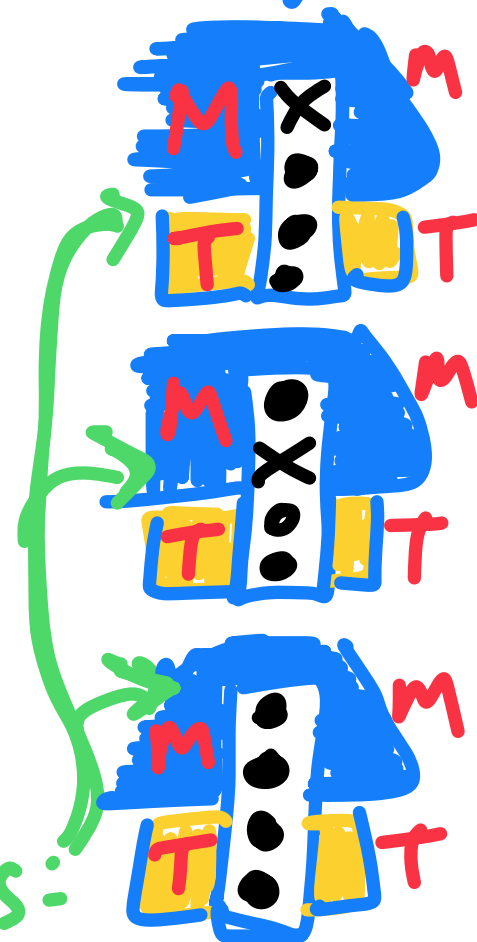
CONT ON NEXT PAGE

ASSEMBLY STEP ②

2.3: WHILE CRANE IS STILL ATTACHED AND ABLE (IF NECESSARY) TO ASSIST WITH ADJUSTING MOVEMENTS, INSTALL AT LEAST ONE MT BOLT IN EITHER OF THE UPPER TWO HOLES OF EACH CLAW, (I.E. MINIMUM OF 2 BOLTS PER **TRESTLE**).

NOTES: • LOWER CLAW BOLTS MAY NEED LOOSENING OR ADJUSTMENT DURING THIS STAGE

- MAKE JUDGEMENT AS TO WHETHER OLEG SPACERS AND PACKING WASHERS CAN BE FITTED WHILE CRANE IS ATTACHED, OR WHETHER IT IS EASIER TO FIT THEM LATER
- DO NOT OVER TIGHTEN UNLESS CONFIDENT THAT OLEG SPACERS / PACKING WASHERS ARE APPROPRIATELY INSTALLED.
- DESIGN IS STRUCTURALLY SOUND IN ANY OF THESE THREE CLAW-BOLT CONFIGS:



ASSEMBLY STEP ② (CONTINUED)

2.4 : THE CRANE MAY BE DETACHED.

2.5 : ANY REMAINING MT-BOLTS AND/OR
OLEG SPACERS AND/OR PACKING WASHERS
CAN BE INSTALLED AT LEISURE
(AS PER MT-CONN DIAG) PROVIDED THAT:

|| AT ANY TIME AT LEAST THREE
BOLTS SHALL ALWAYS PENETRATE
EACH CLAW-PAIR WHILE BEING
AT LEAST "FINGER TIGHT"! ||

2.6 : DO FINAL CHECK OF TIGHTNESS ON
ALL FIXINGS, TAKING SPECIAL CARE
WITH UPPER CLAW BOLTS WHICH SHOULD NOT
BE OVER TIGHTENED UNLESS WELL PACKED.

END

A-SIDE PHOTOS

(NOTE: SOME BOLTS ARE IN BACKWARDS)

SPACERS ARE ON FLOOR
BUT SHOULD BE ON TOP

↑ 3A, 6A, 5A should have
heads on outside



B-SIDE PHOTOS

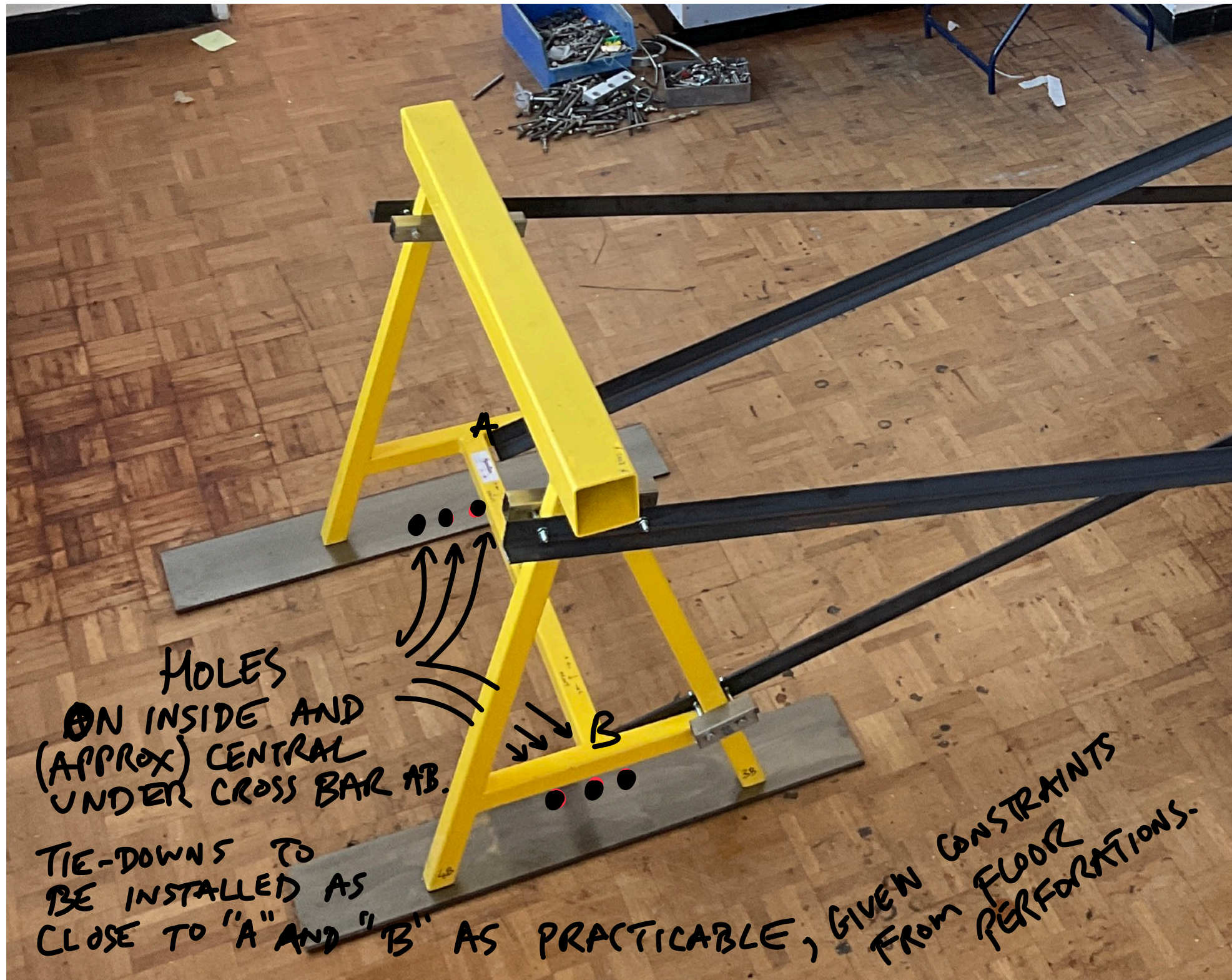
(NOTE: SOME BOLTS ARE IN BACKWARDS)

SPACERS ARE ON FLOOR
BUT SHOULD BE ON TOP

↑ 8B, 7B, 2B should have heads
on outside.

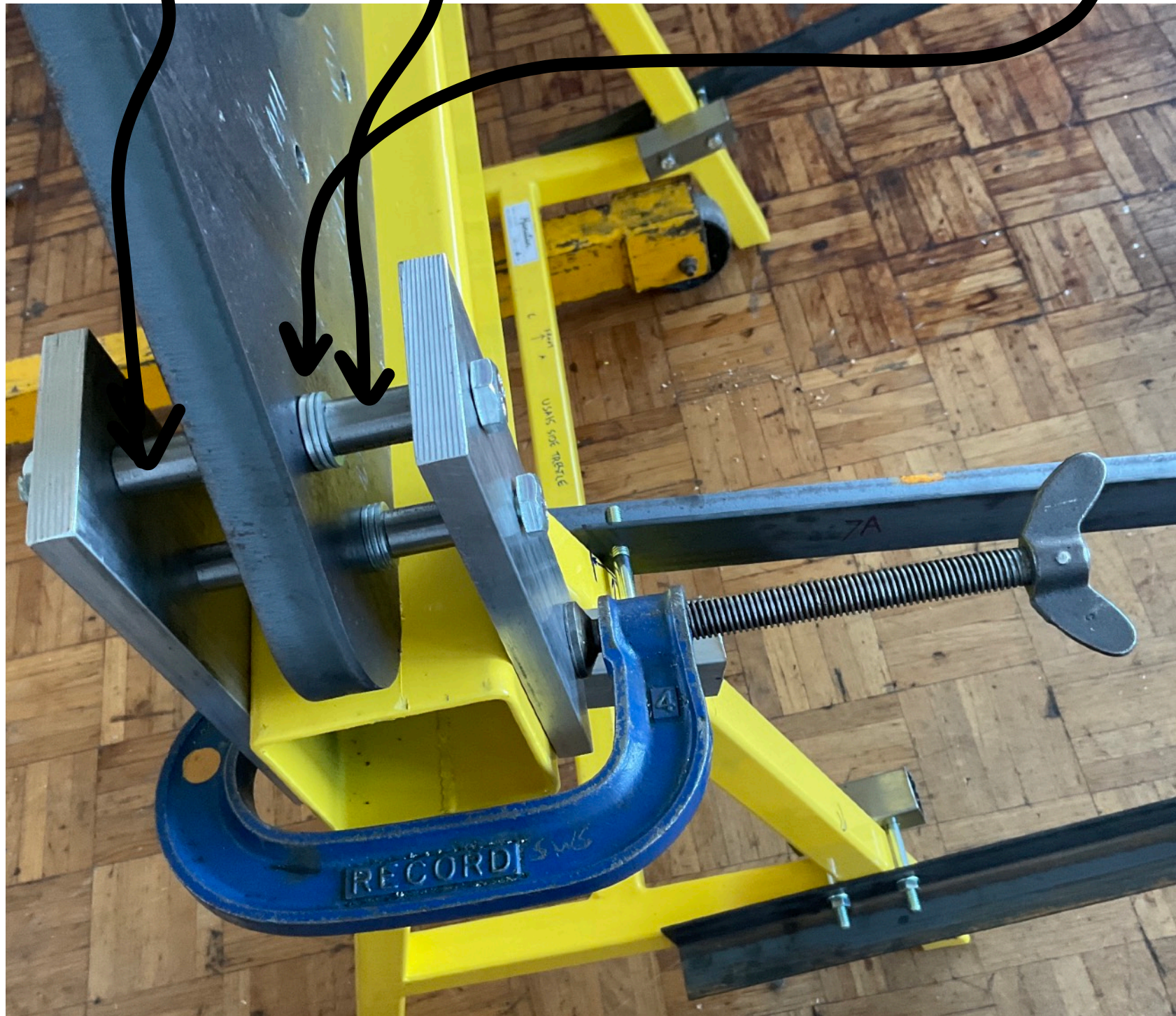


PHOTO TO SHOW APPROX LOCATION
OF FLOOR-PLATES RELATIVE TO
TRESTLES:



A PARTIALLY INSTALLED CLAW SHOWN
WITH MOUNTAIN AND TRESTLE.

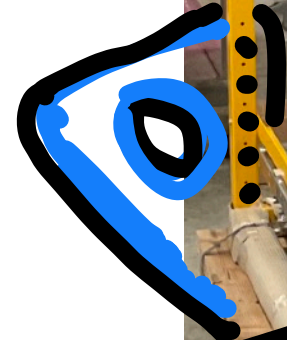
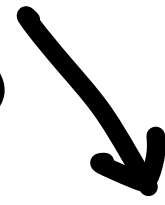
OLEG SPAKERS AND PACKING WASHERS ARE
VISIBLE.



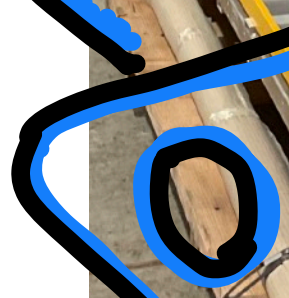
AT TIME OF
PHOTO, BOTTOM
HOLES IN CLAWS
HAD NOT YET BEEN
DRILLED.

CORRECT ORIENTATION OF MOUNTAINS DURING ASSEMBLY STEP 1A.4.

USA15 MOUNTAIN
IN BACKGROUND



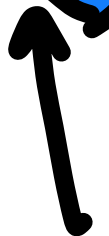
5-HOLES



3 HOLES



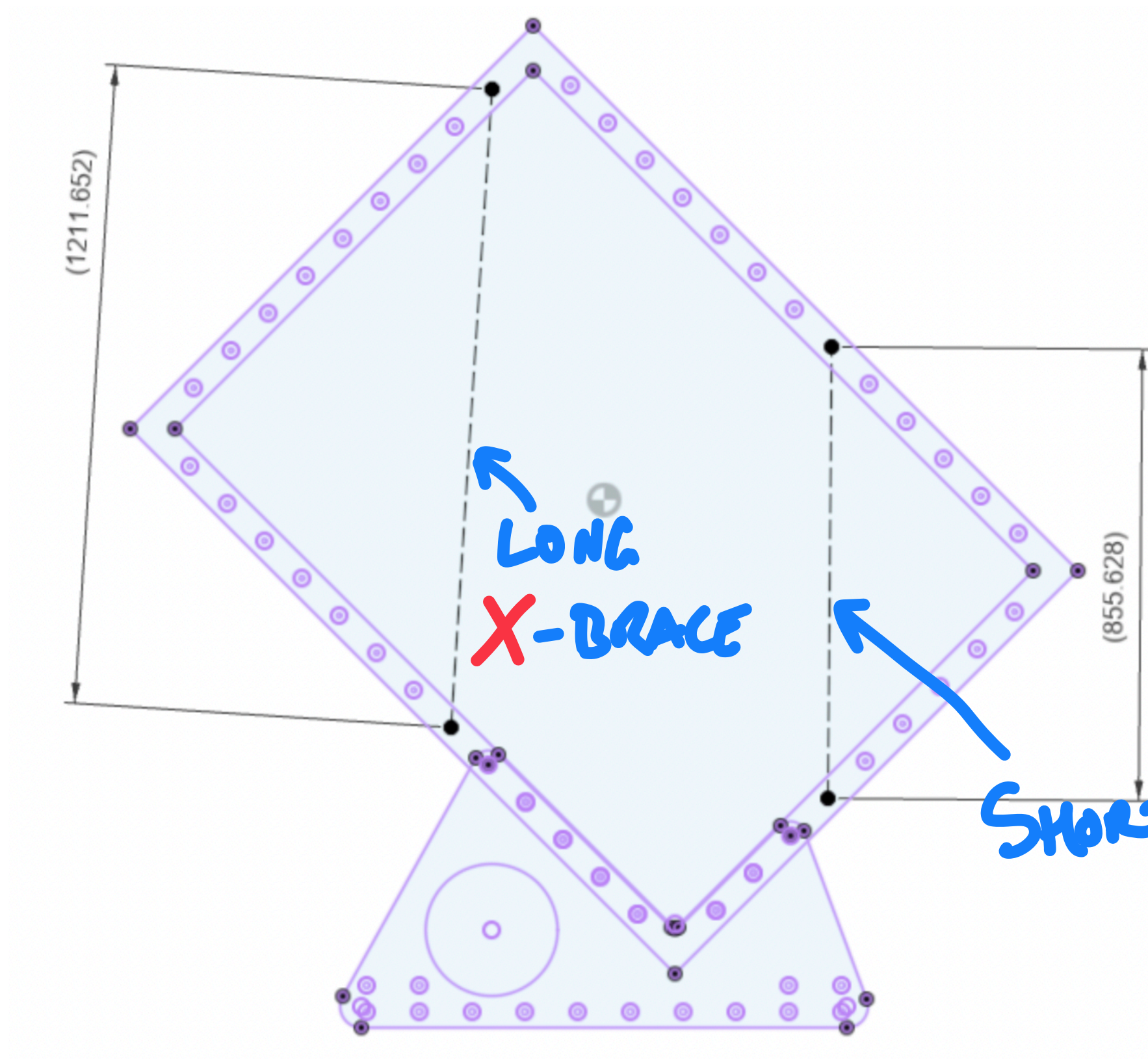
US15 MOUNTAIN
IN FOREGROUND



NOTE :

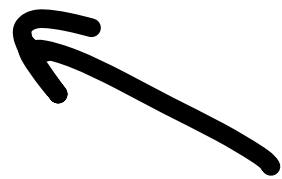
- LONG SIDE OF MOUNTAIN WITH 5-HOLES IS VERTICAL
- SHORT SIDE OF MOUNTAIN WITH 3-HOLES IS HORIZONTAL.

LOCATION OF X-BRACES (BOTH ENDS)

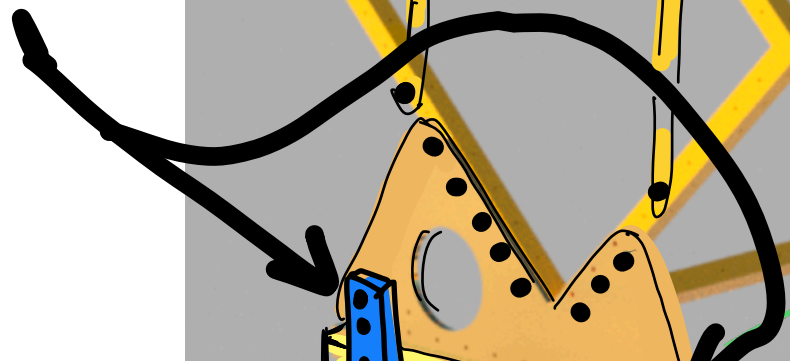


END PRODUCT (APPROX)

A-SIDE



CLAW



FRAME



USA 15



MOUNTAIN



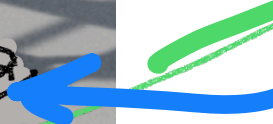
TRESTLE



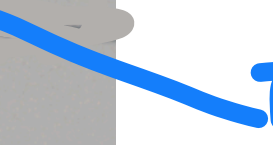
FLOOR



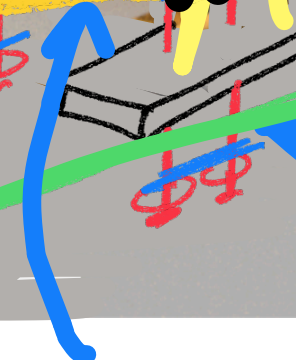
FLOOR-PLATE



TIE-DOWN



BRACES



VS15



C SIDE

