

ALAT TENUN ERGONOMIS PANDUAN KONSTRUKSI

Desember 2022



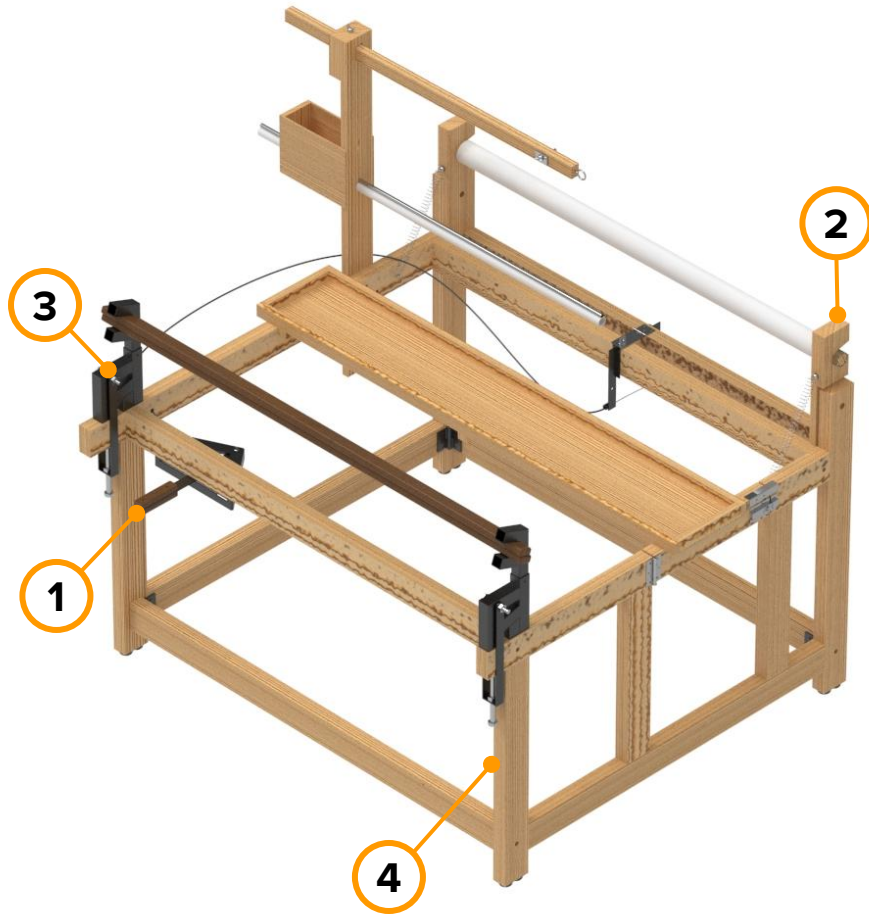
Kopernik, dengan dukungan dari Polish Aid dan TORAJAMELO, bekerja sama dengan Harness Loom dalam mengembangkan purwarupa alat tenun ergonomis.

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TENTANG ALAT TENUN ERGONOMIS



Alat tenun ergonomis dirancang untuk mengurangi rasa sakit pada punggung dan meningkatkan kenyamanan posisi menenun. Beberapa fitur dibuat untuk melengkapi kebutuhan teknik tenun yang diturunkan dari generasi ke generasi.

- 1** **2** **Tuas set dan lengan gerak**
Berfungsi mengatur kencang-kendor tegangan kain, menggantikan kerja pinggang dan telapak kaki pada alat tenun tradisional.
- 3** **Blok rotator**
Berfungsi mengubah fitur neket* menjadi fitur tenun, sehingga satu alat tenun ergonomis ini dapat digunakan untuk dua kegiatan sekaligus.
- 4** **Posisi lebih tinggi**
Membuat kegiatan neket dan tenun dapat dilakukan dengan posisi duduk di kursi. Sehingga lebih nyaman dan mengurangi rasa sakit.

*Neket: proses awal penyusunan helai demi helai benang berdasarkan warna dan motif.

KOMPONEN ALAT TENUN ERGONOMIS

Berikut adalah 15 komponen alat tenun ergonomis beserta jumlahnya:



Rangka Kanan
1 buah



Rangka Kiri
1 buah



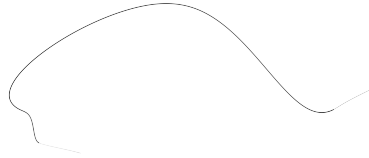
Rangka Depan
2 buah



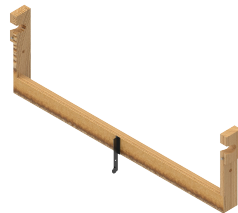
Rangka Belakang
2 buah



Tiang Lampu & Lampu
1 buah



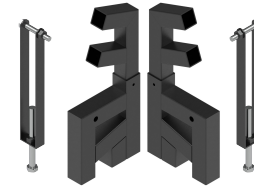
Kabel Seling
1 set



Lengan Gerak
1 buah



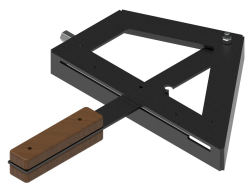
Lungsi Depan
1 buah



**Blok Rotator &
Garpu Pengunci**
2 buah (kiri dan kanan)



Lungsi Belakang
1 set (2 buah)



Tuas Set
1 set



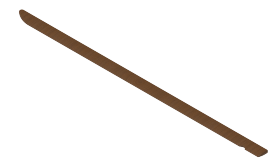
Tiang Neket
1 buah



Meja Benang
1 buah



**Pipa PVC &
Pipa Aluminium**
Masing-masing 1 buah



Pisau Surit
1 buah

MATERIAL YANG DIBUTUHKAN

Nama Bagian	Material	Ukuran (mm)
Rangka Kanan	Kayu Pinus	5080 x 80 x 40
Rangka Kiri	Kayu Pinus	3970 x 80 x 40
Rangka Depan	Kayu Pinus	2620 x 80 x 40
Besi Rangka Depan	Plat Besi 3 mm	270 x 25 x 3
Rangka Belakang	Kayu Pinus	2620 x 80 x 40
Lengan Gerak	Kayu Pinus	1290 x 90 x 40
	Kayu Pinus	1140 x 90 x 20
Lungsi Depan	Pipa Aluminium 40 mm	120
	Pipa PVC 2 inch	1240
	Kayu Pinus	1360 x 12 x 20
	Kayu Pinus	1360 x 20 x 43
Blok Rotator Tenun	Besi <i>Hollow</i> 34 mm	542 x 34 x 34
Blok Rotator Neket	Besi <i>Hollow</i> 30 mm	440 x 30 x 30
Lungsi Belakang	Kayu Kelapa	2900 x 50 x 20
Tuas Set	Plat Besi 3 mm	1843 x 30 x 3
	Kayu Kelapa	250 x 30 x 15

MATERIAL YANG DIBUTUHKAN

Nama Bagian	Material	Ukuran (mm)
Tiang Neket	Multiplex 5 mm	470 x 170 x 5
	Kayu Pinus	1420 x 90 x 20
	Kayu Pinus	170 x 90 x 15
Tiang Lampu	Kayu Pinus	1000 x 35 x 25
Garpu Pengunci	Besi Plat 3 mm	642 x 25 x 3
Pipa PVC	Pipa PVC ¾ inch	1200
Pipa Aluminium	Pipa Aluminium 10 mm	1200
Meja Benang	Multiplex 5 mm	1450 x 250 x 5
	Kayu Pinus	4070 x 30 x 20
Pisau Surit	Kayu Kelapa	1200 x 50 x 15

ALAT-ALAT YANG DIBUTUHKAN

Berikut adalah 20 peralatan yang dibutuhkan untuk membuat alat tenun ergonomis.



Mesin Gergaji Meja



Mesin Kompresor Angin



Mesin Bor Duduk



Mesin Bor Tangan



Mesin Router



Mesin Las



Mesin Ketam Listrik



Gerinda Potong Besi



Gerinda Amplas Kayu



Mesin Amplas Kayu

ALAT-ALAT YANG DIBUTUHKAN

Berikut adalah 20 peralatan yang dibutuhkan untuk membuat alat tenun ergonomis.



Gergaji Kayu



Gergaji Besi



Spray Gun Cat



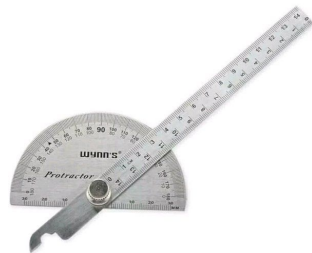
Kuas



Penggaris



Waterpass



Busur Derajat



Palu

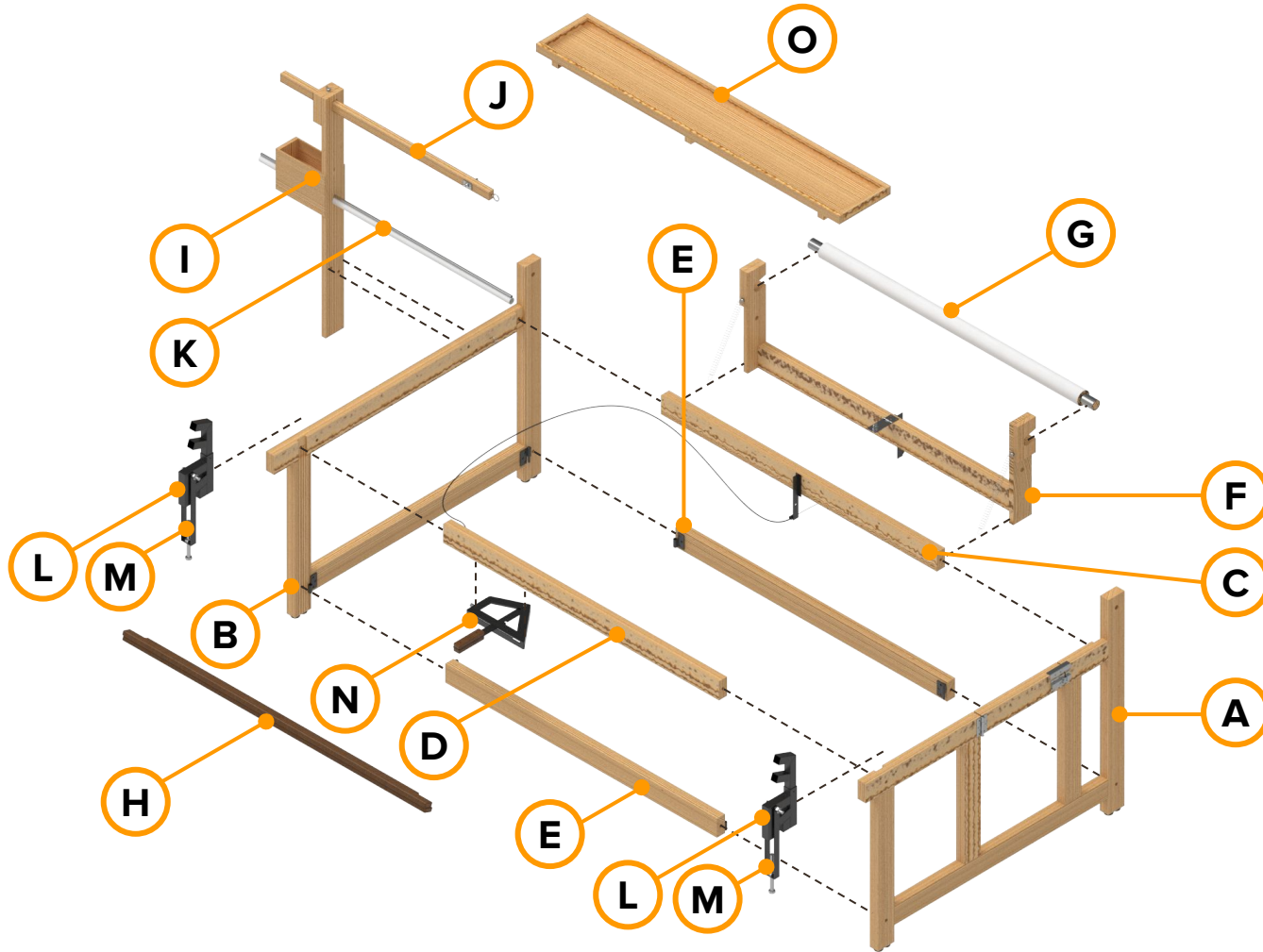


Linggis



Alat pahat kayu

TAMPILAN ELEMEN ALAT TENUN ERGONOMIS



Kode Nama Komponen

- A Rangka Kanan
- B Rangka Kiri
- C Rangka Depan Atas
- D Rangka Belakang Atas
- E Rangka Depan Bawah & Rangka Belakang Bawah
- F Lengan Gerak
- G Lungsi Depan
- H Lungsi Belakang
- I Tiang Neket
- J Tiang Lampu
- K Pipa PVC & Pipa Aluminium
- L Blok Rotator
- M Garpu Pengunci
- N Tuas Set
- O Meja Benang

RANGKA KANAN

T80

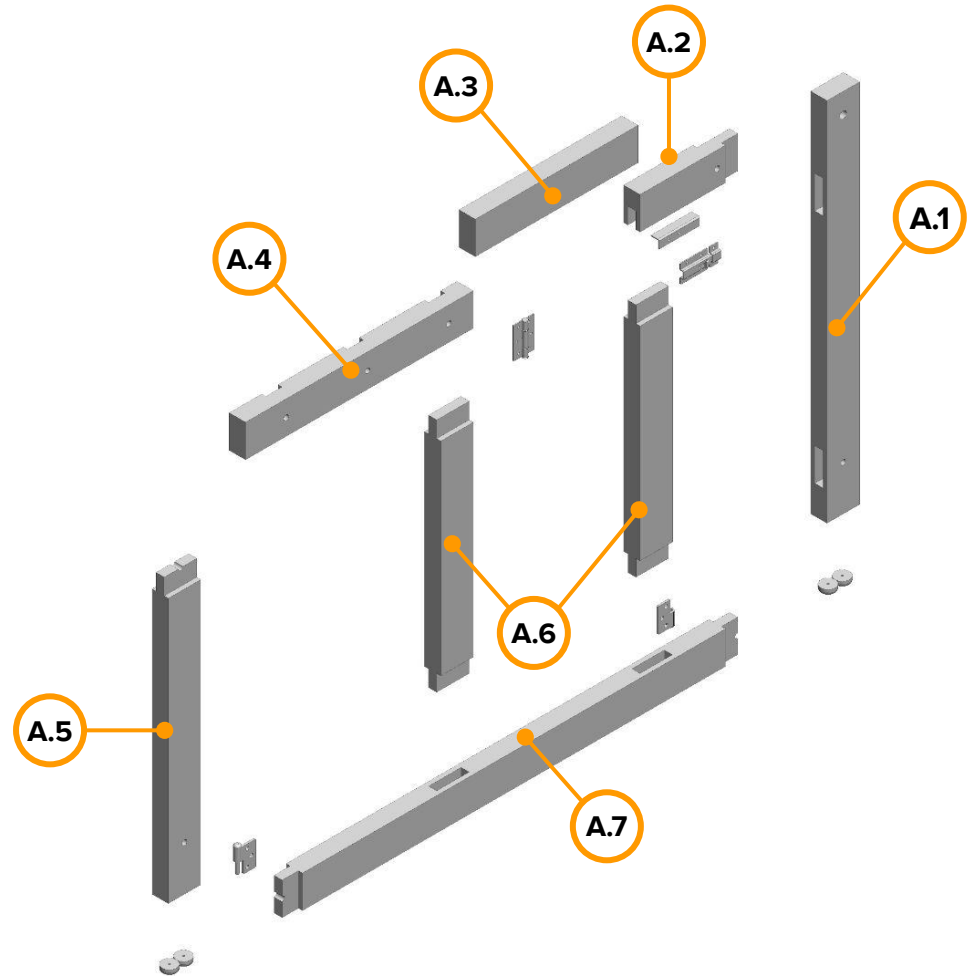
N80

T100

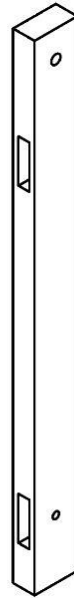
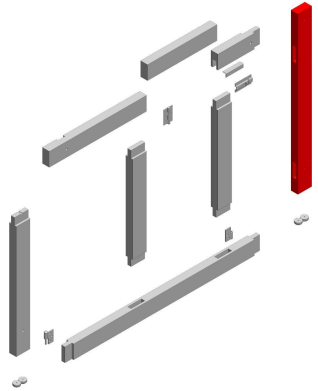
N100

N120

RANGKA KANAN - A



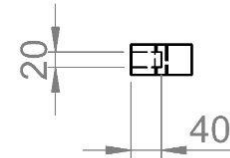
RANGKA KANAN - A.1



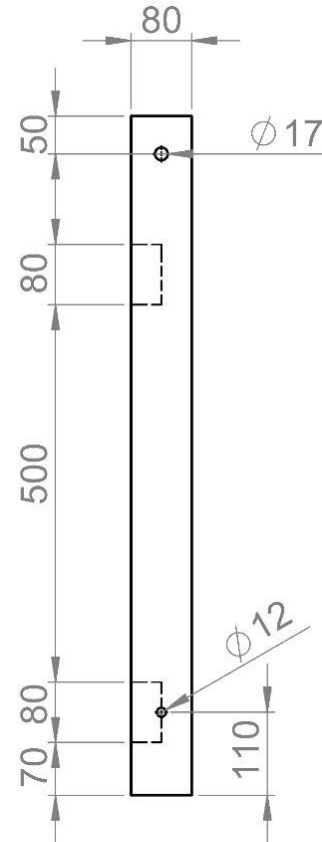
No	Peralatan
1	Gergaji
2	Router
3	Alat pahat kayu
4	Palu

Skala 1:10
Satuan: milimeter

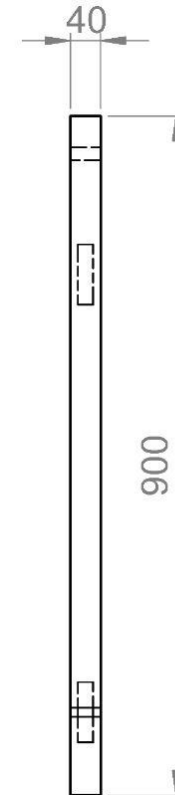
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	900 x 80 x 40	1 buah



Tampak Atas

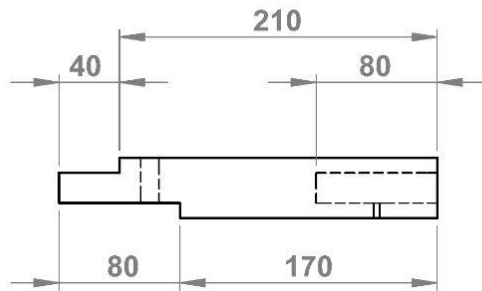
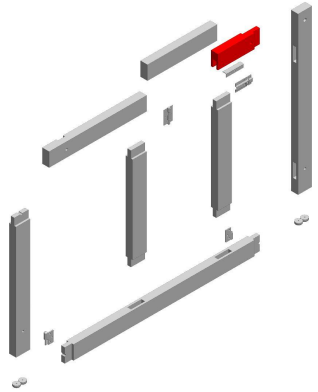


Tampak Depan

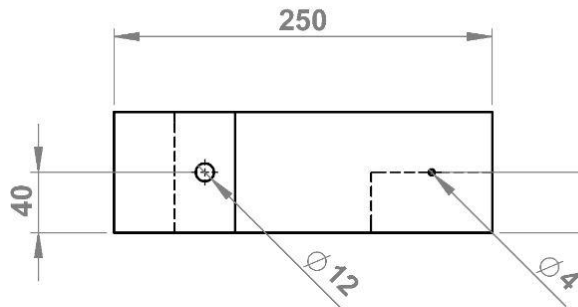


Tampak Samping

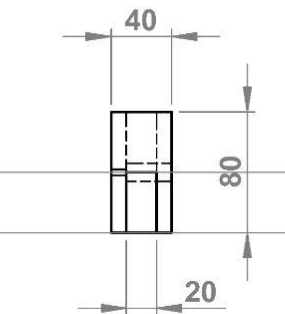
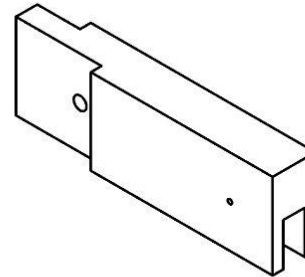
RANGKA KANAN - A.2



Tampak Atas



Tampak Depan



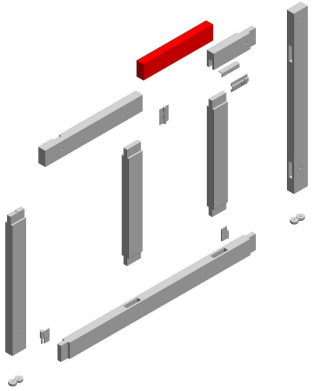
Tampak Samping

No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	250 x 80 x 40	1 buah

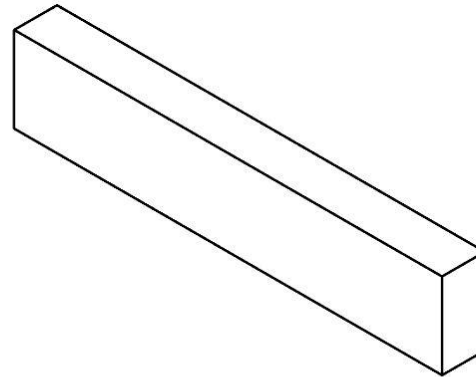
No	Peralatan
1	Gergaji
2	Router
3	Alat pahat kayu
4	Palu

Skala 1:5
Satuan: milimeter

RANGKA KANAN - A.3



No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	400 x 80 x 40	1 buah



No	Peralatan
1	Gergaji

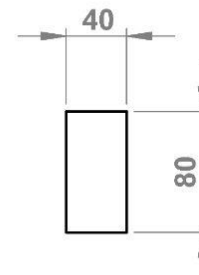
Skala 1:5
Satuan: milimeter



Tampak Atas

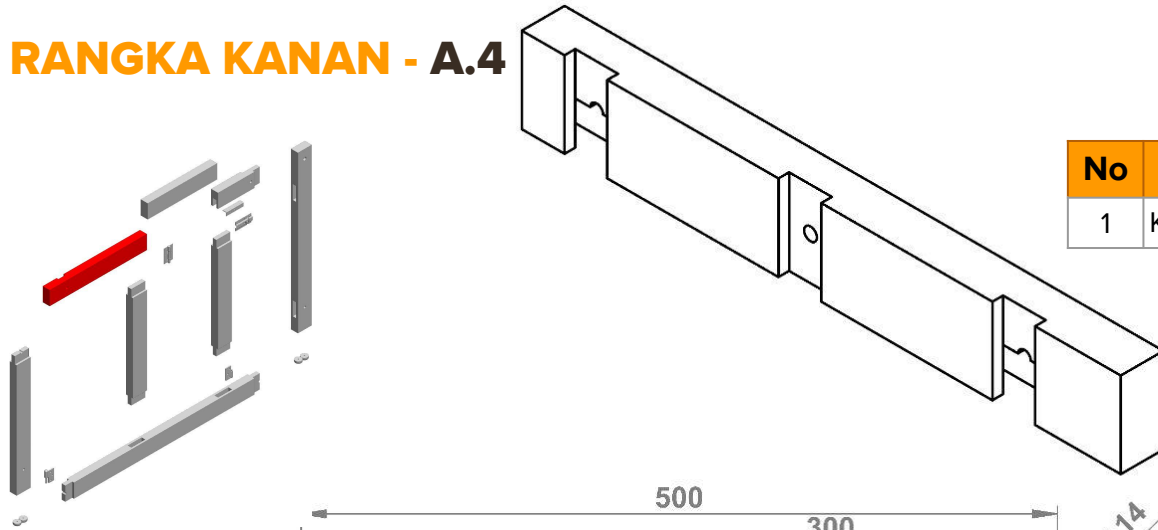


Tampak Depan



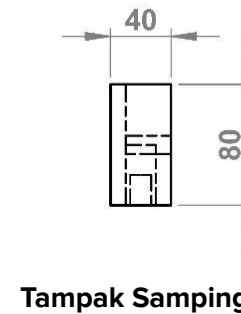
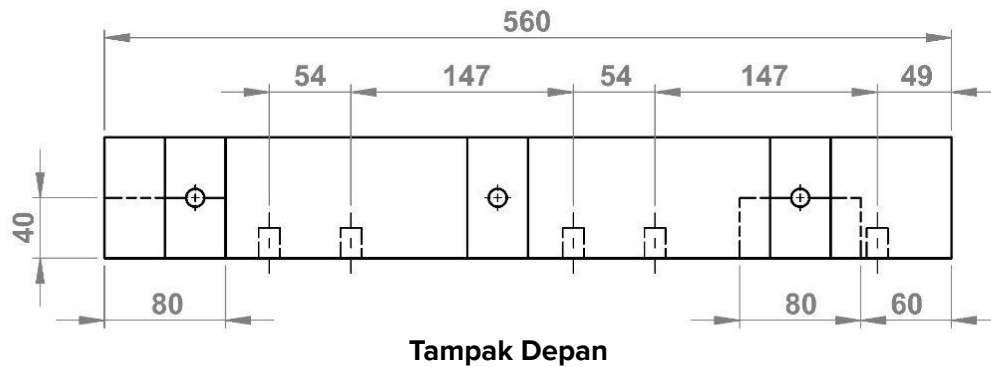
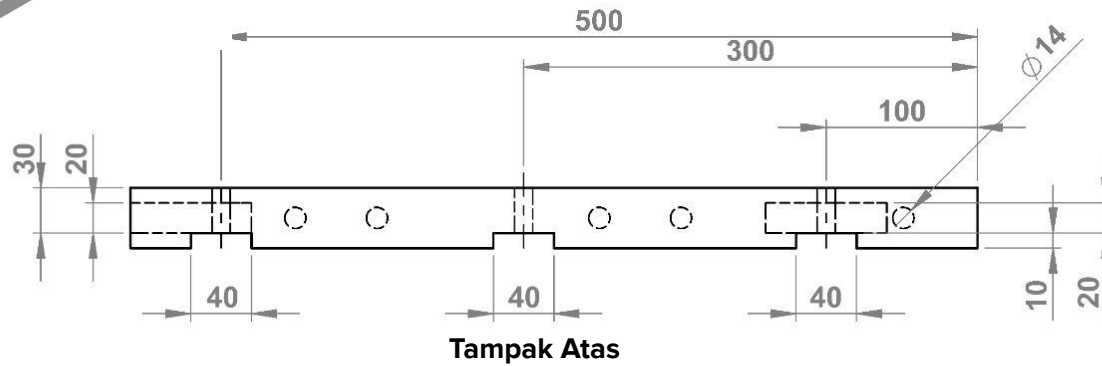
Tampak Samping

RANGKA KANAN - A.4



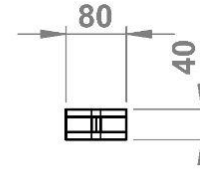
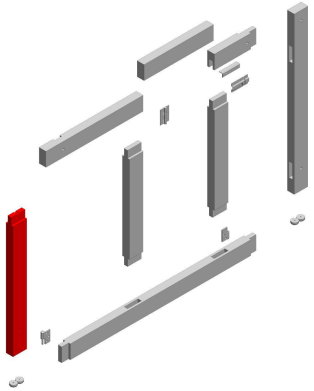
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	560 x 80 x 40	1 buah

No	Peralatan
1	Gergaji
2	Router
3	Alat pahat kayu
4	Palu

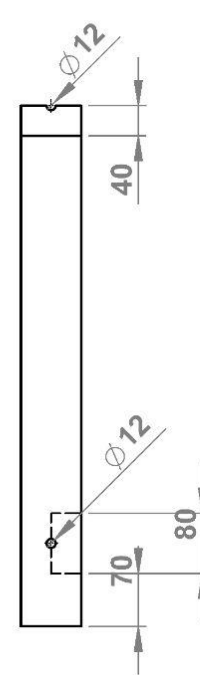


Skala 1:5
Satuan: milimeter

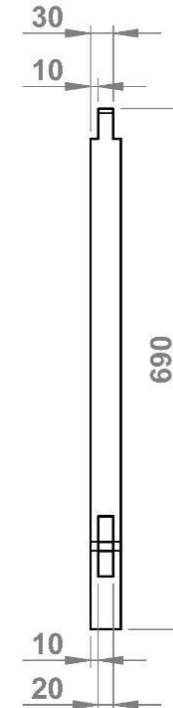
RANGKA KANAN - A.5



Tampak Atas



Tampak Depan



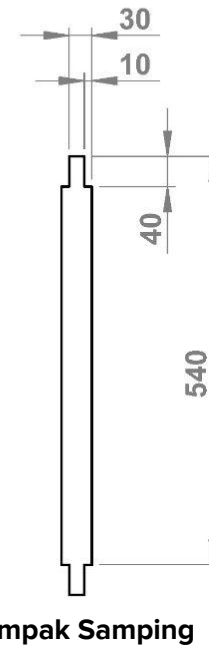
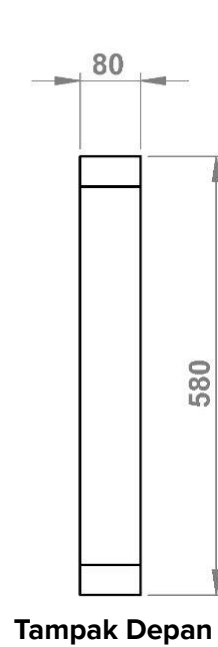
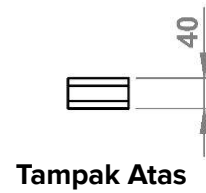
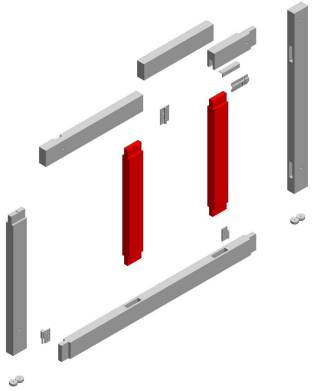
Tampak Samping

No	Peralatan
1	Gergaji
2	Router
3	Alat pahat kayu
4	Palu

Skala 1:10
Satuan: milimeter

No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	690 x 80 x 40	1 buah

RANGKA KANAN - A.6

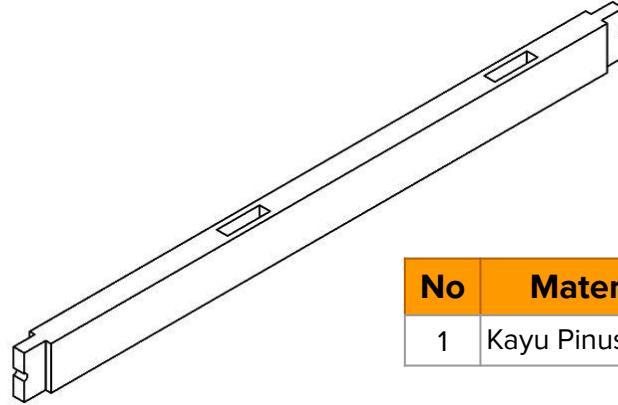
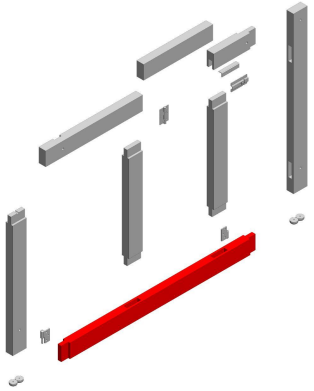


No	Peralatan
1	Gergaji
2	Alat pahat kayu
3	Palu

Skala 1:10
Satuan: milimeter

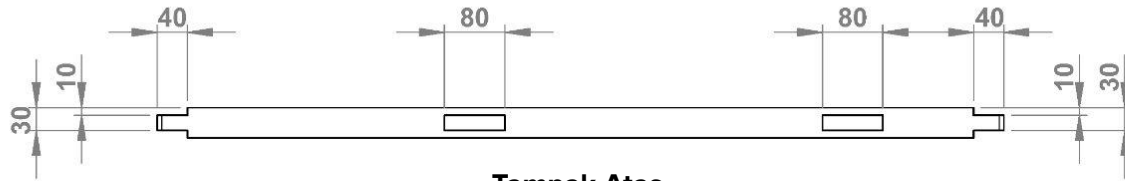
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	580 x 80 x 40	2 buah

RANGKA KANAN - A.7

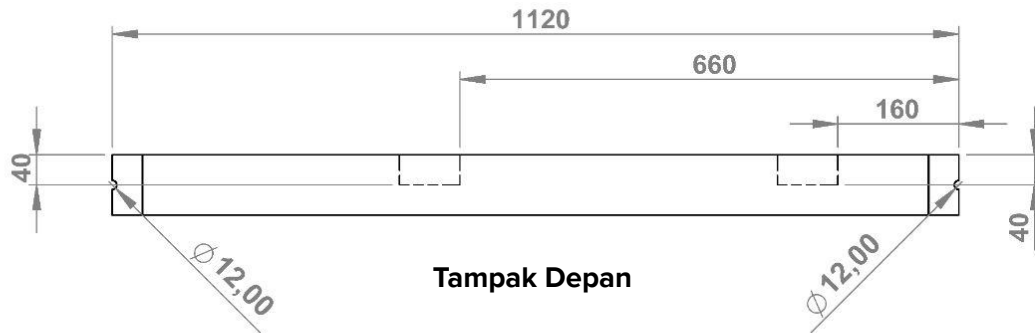


No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	1120 x 80 x 40	1 buah

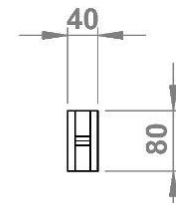
No	Peralatan
1	Gergaji
2	Router/bor
3	Alat pahat kayu
4	Palu



Tampak Atas



Tampak Depan

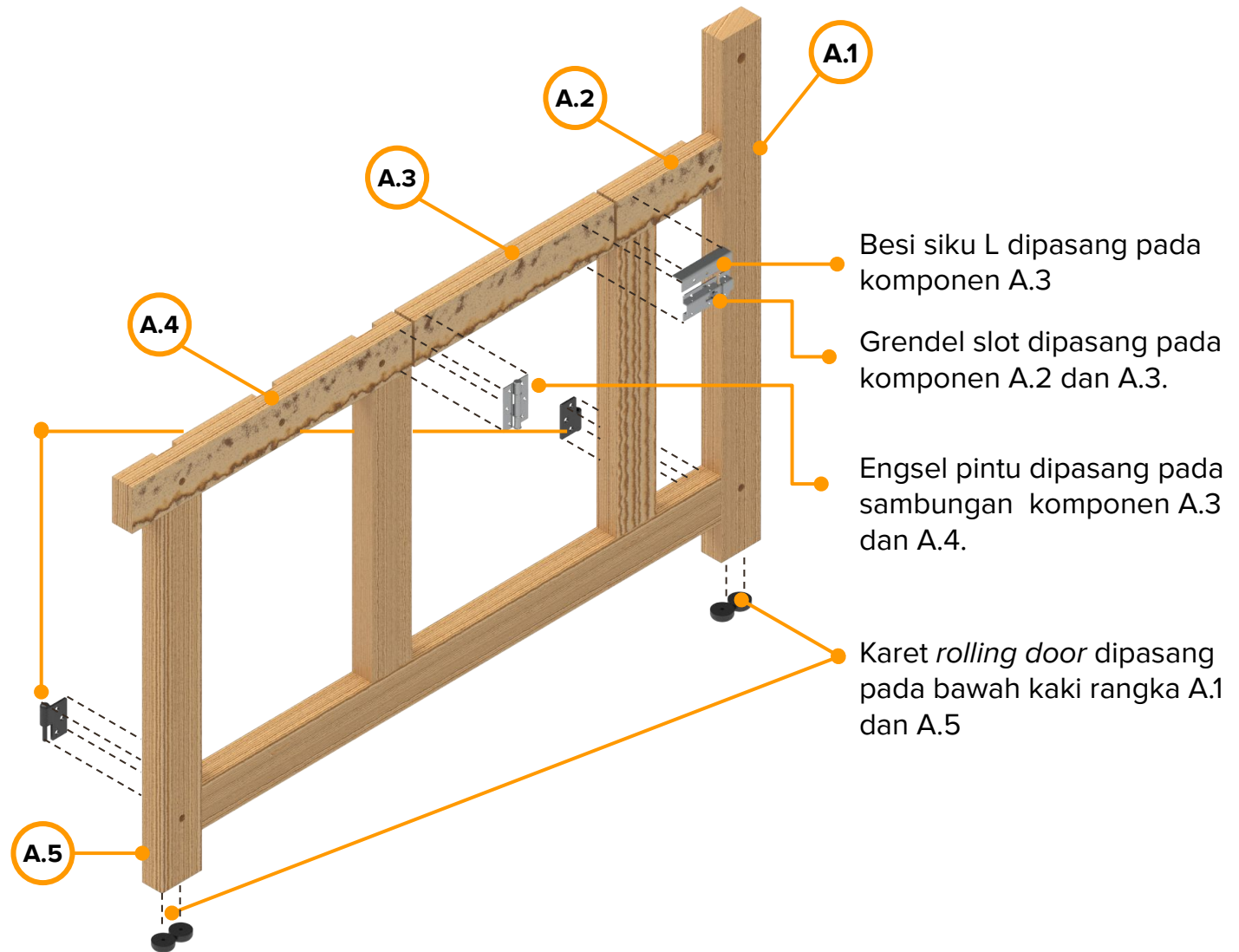


Tampak Samping

Skala 1:10
Satuan: milimeter

RANGKA KANAN - PERAKITAN

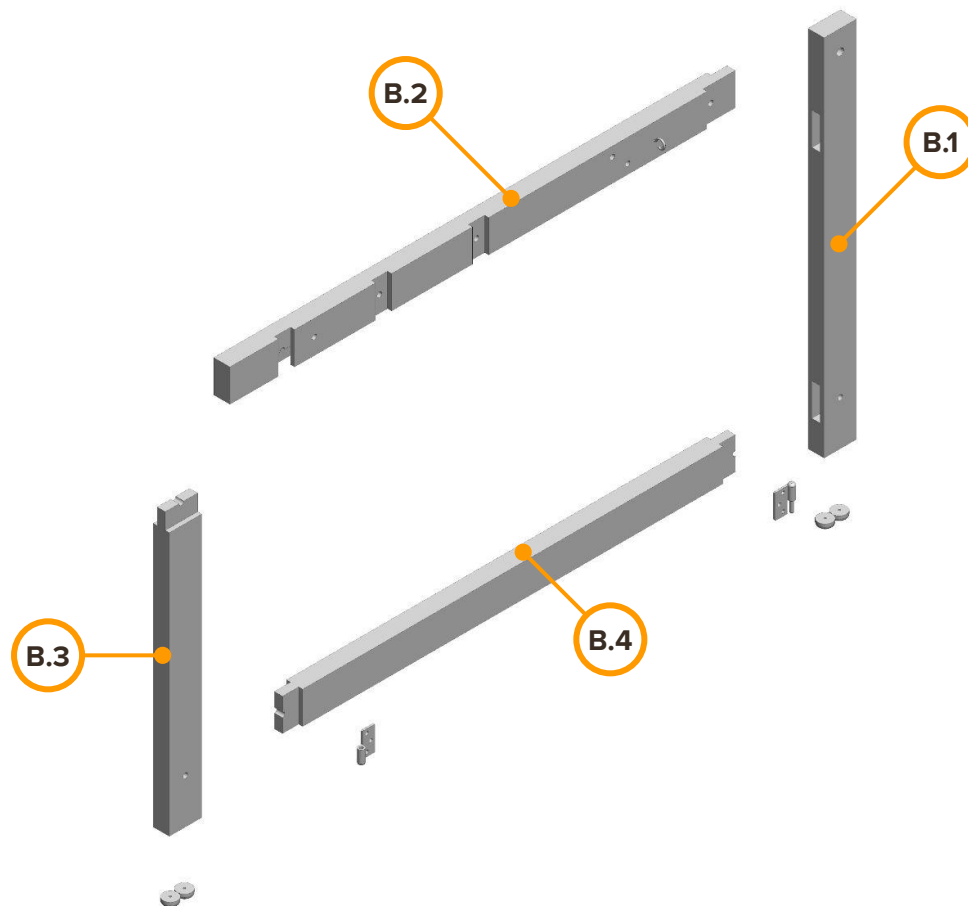
Pasang engsel rangka pada sisi bagian dalam rangka kanan



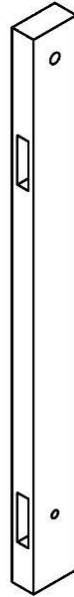
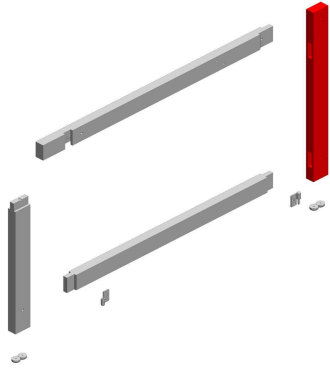
A wooden frame structure, possibly a workbench or a support for a machine, is shown outdoors. The frame is made of light-colored wood and has several horizontal beams. A black metal clamp is attached to the top beam. Handwritten labels in green and red ink are visible on the wood: 'T80', 'N80', 'T100', 'N100', and 'N120'. A blue cable is connected to the frame. The background shows a grassy area and a wooden chair.

RANGKA KIRI

RANGKA KIRI - B



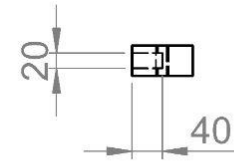
RANGKA KIRI - B.1



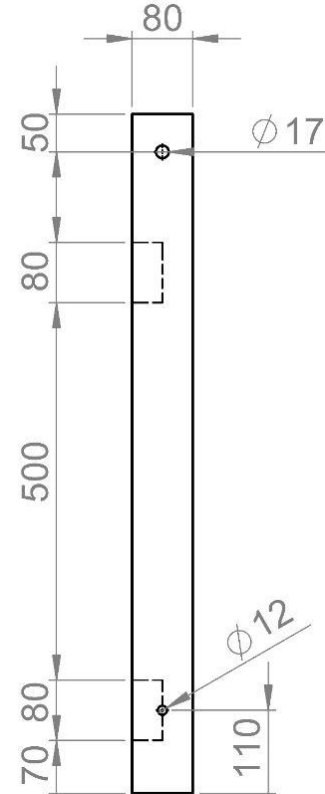
No	Peralatan
1	Gergaji
2	Router
3	Alat pahat kayu
4	Palu

Skala 1:10
Satuan: milimeter

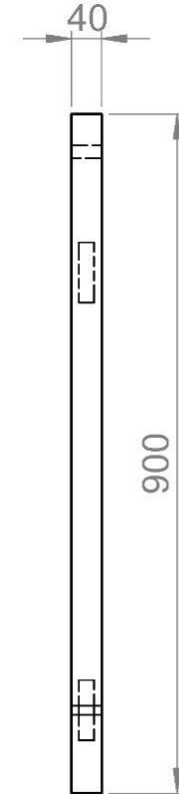
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	900 x 80 x 40	1 buah



Tampak Atas

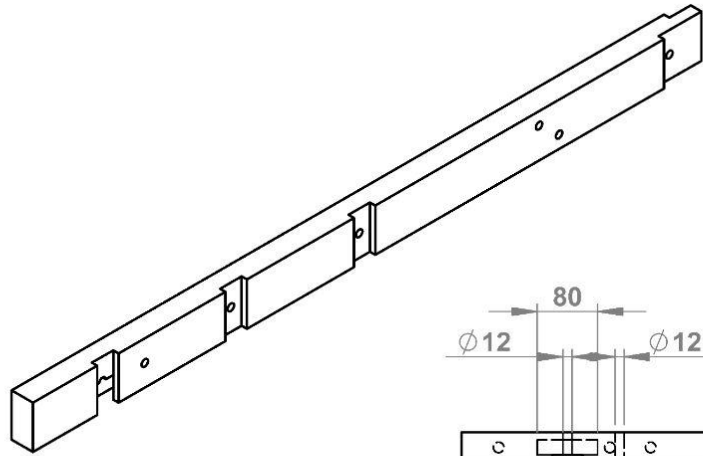


Tampak Depan



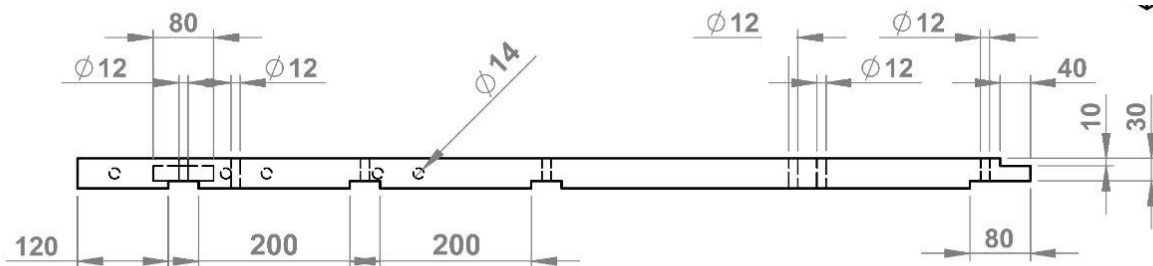
Tampak Samping

RANGKA KIRI - B.2

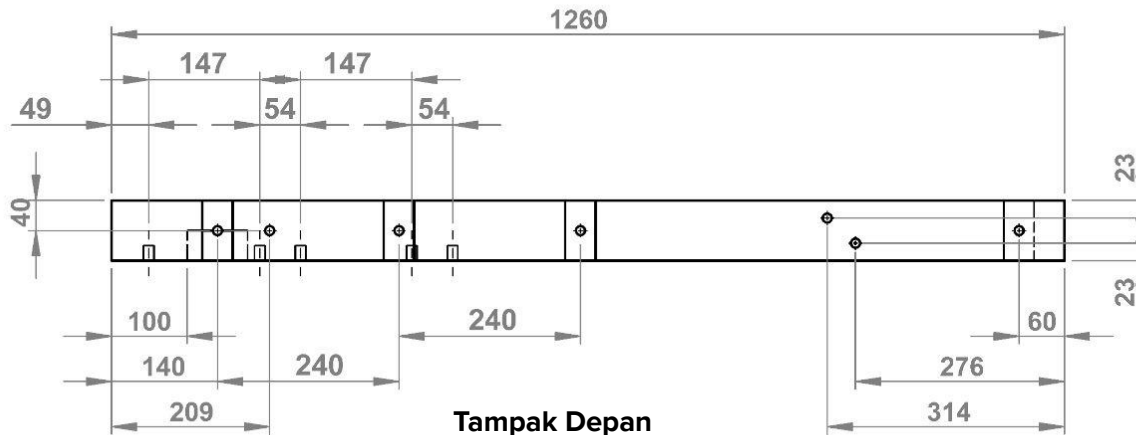


No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	1260 x 80 x 40	1 buah

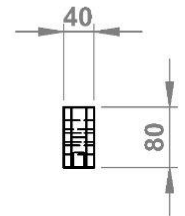
No	Peralatan
1	Gergaji
2	Router/bor
3	Alat pahat kayu
4	Palu



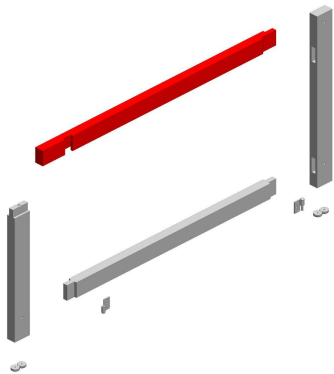
Tampak Atas



Tampak Depan

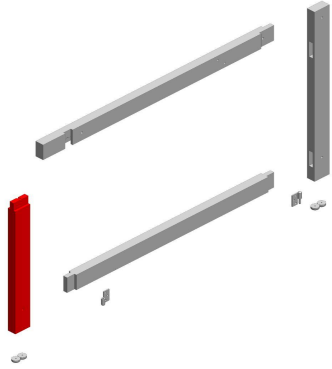


Tampak Samping



Skala 1:10
Satuan: milimeter

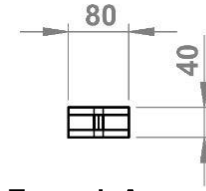
RANGKA KIRI - B.3



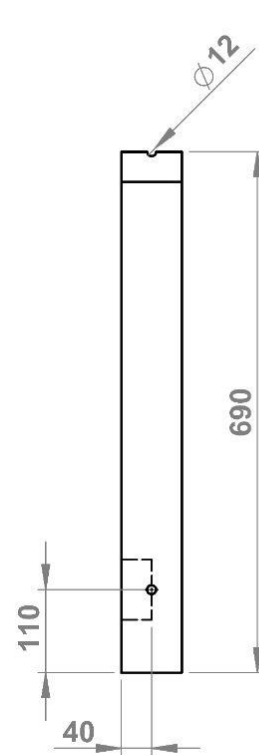
No	Peralatan
1	Gergaji
2	Router
3	Alat pahat kayu
4	Palu

Skala 1:10
Satuan: milimeter

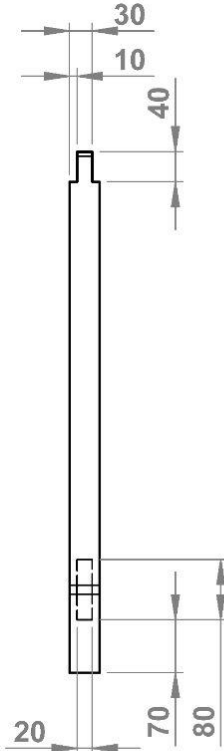
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	690 x 80 x 40	1 buah



Tampak Atas

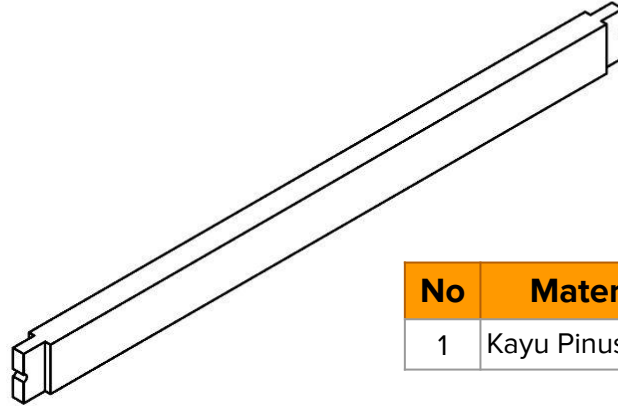
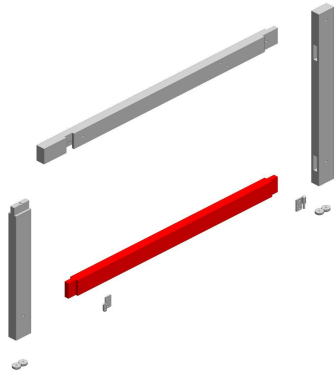


Tampak Depan

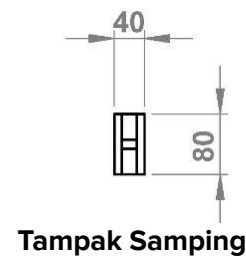
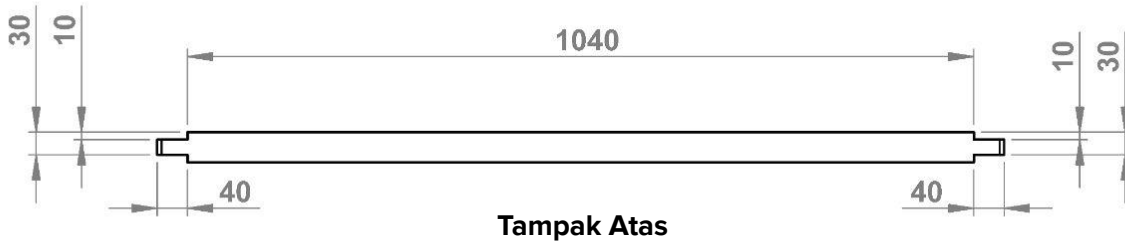


Tampak Samping

RANGKA KIRI - B.4



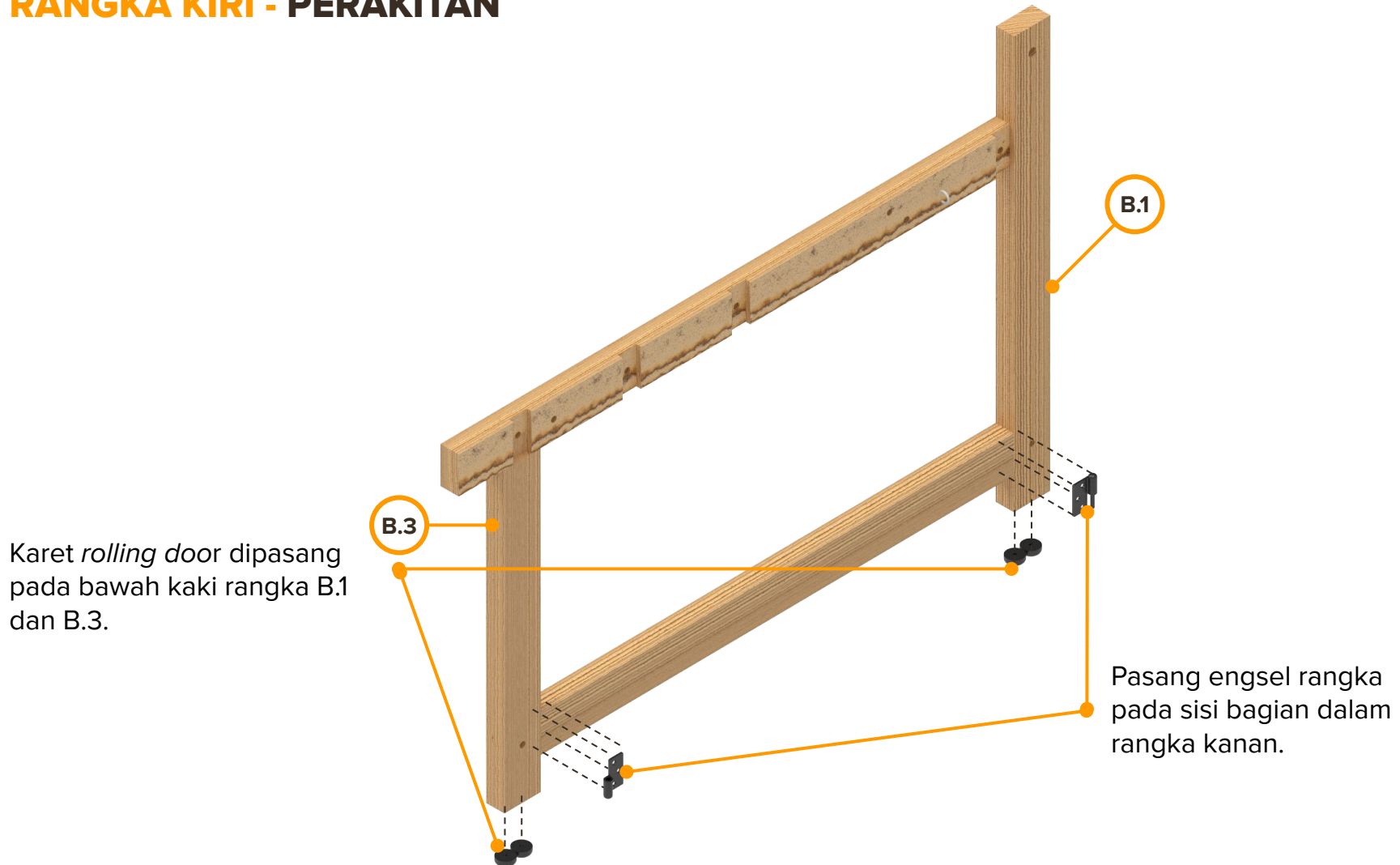
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	1120 x 80 x 40	1 buah



No	Peralatan
1	Gergaji
2	Router/bor
3	Alat pahat kayu
4	Palu

Skala 1:10
Satuan: milimeter

RANGKA KIRI - PERAKITAN



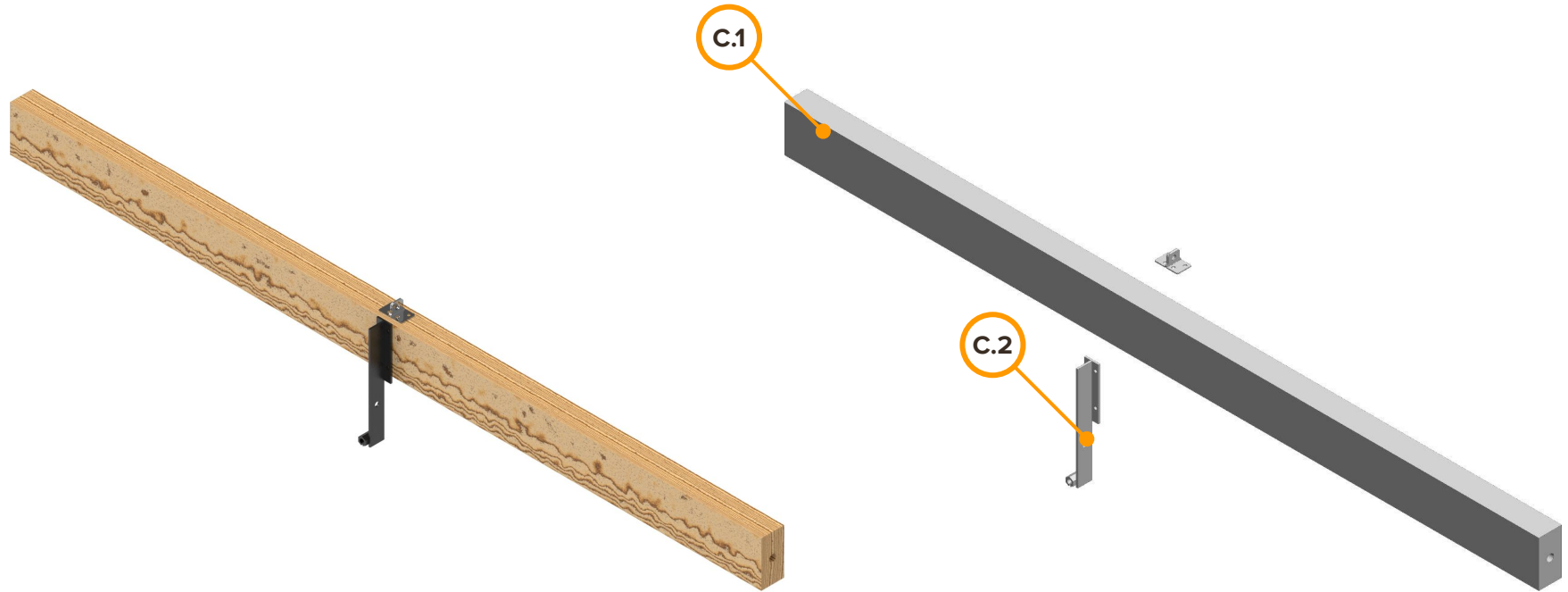
Karet *rolling door* dipasang pada bawah kaki rangka B.1 dan B.3.

Pasang engsel rangka pada sisi bagian dalam rangka kanan.

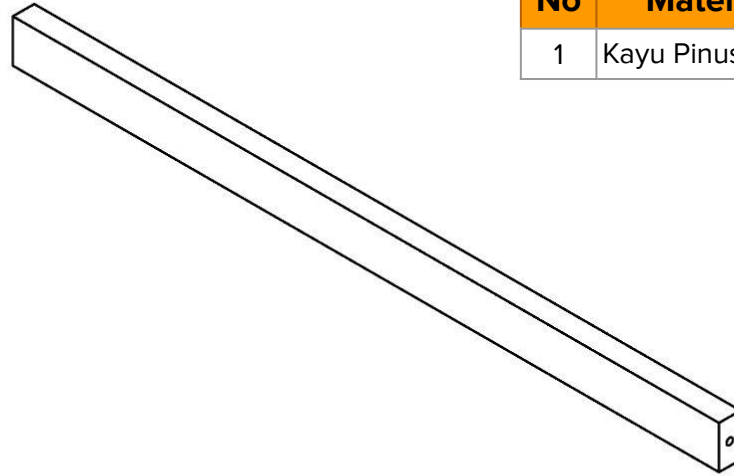
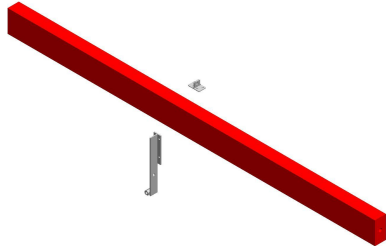


**RANGKA DEPAN &
RANGKA BELAKANG**

RANGKA DEPAN ATAS - C



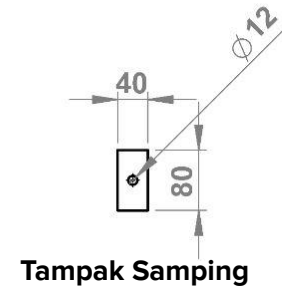
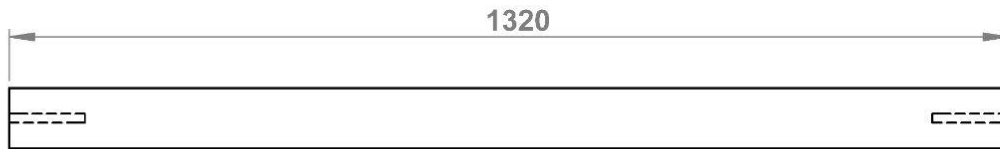
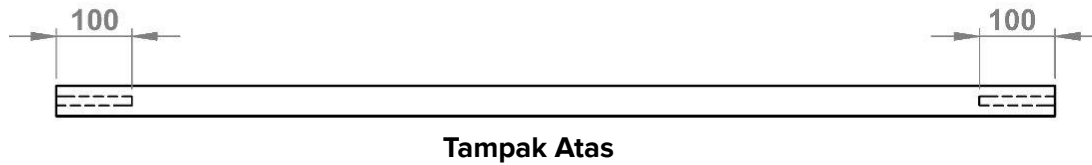
RANGKA DEPAN ATAS - C.1



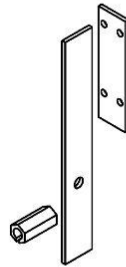
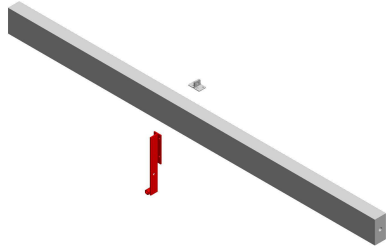
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	1320 x 80 x 40	1 buah

No	Peralatan
1	Gergaji
2	Bor duduk

Skala 1:10
Satuan: milimeter



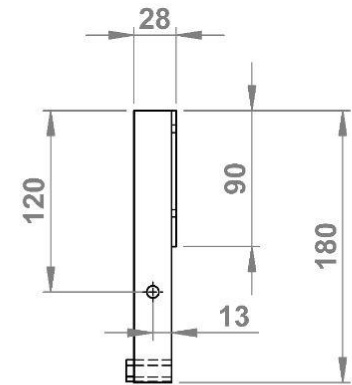
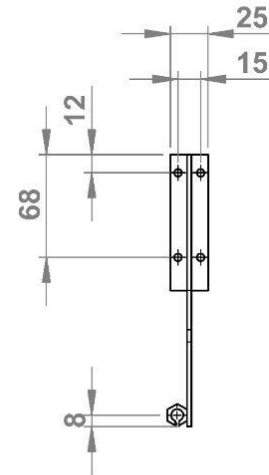
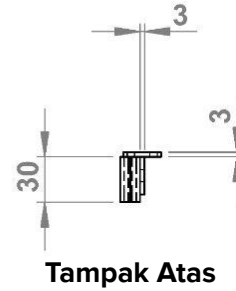
RANGKA DEPAN ATAS - C.2



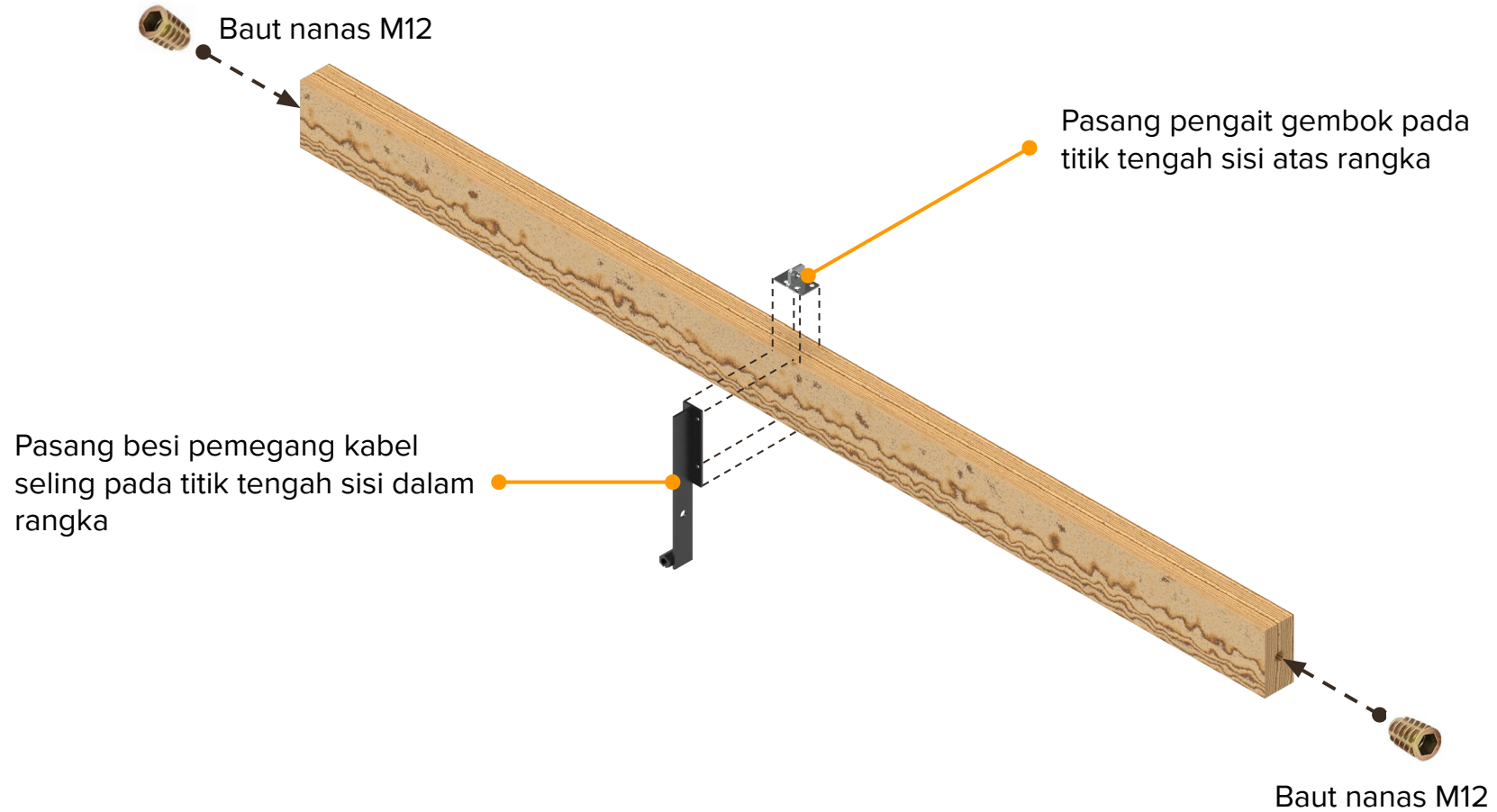
No	Peralatan
1	Gerinda potong besi
2	Mesin las
3	Kompresor angin
4	<i>Spray gun</i> cat

Skala 1:5
Satuan: milimeter

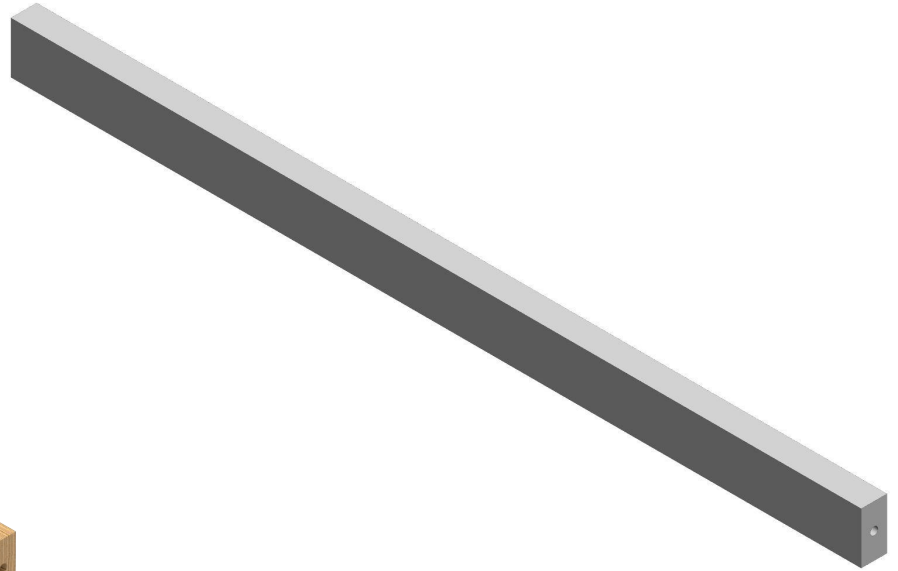
No	Material	Ukuran (mm)	Jumlah
1	Plat besi 3mm	270 X 25	1 buah
2	Mur M8 Panjang	30 mm	1 buah



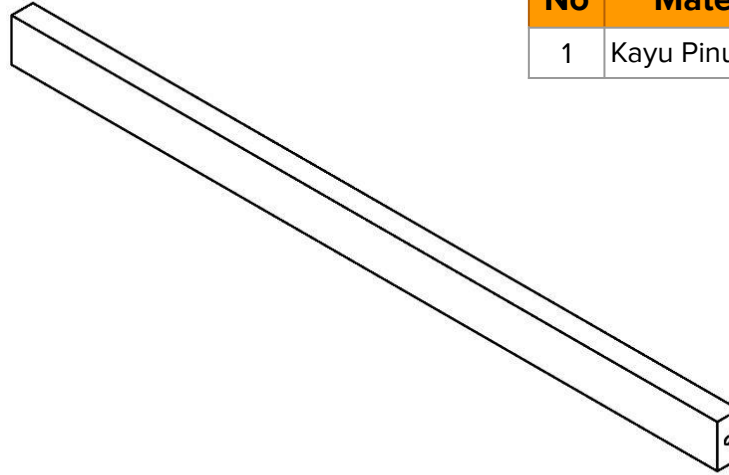
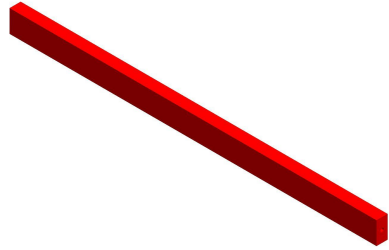
RANGKA DEPAN ATAS (PERAKITAN)



RANGKA BELAKANG ATAS - D



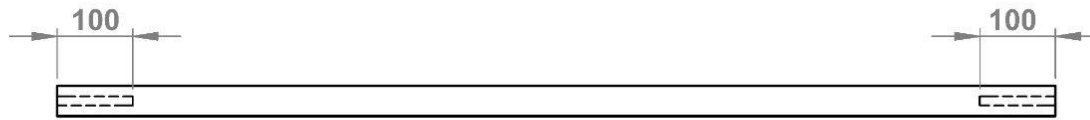
RANGKA BELAKANG ATAS - D



No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	1320 x 80 x 40	1 buah

No	Peralatan
1	Gergaji
2	Bor duduk

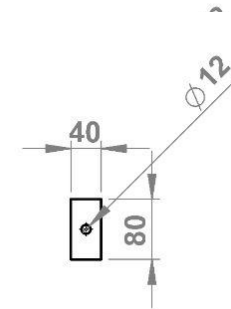
Skala 1:10
Satuan: milimeter



Tampak Atas

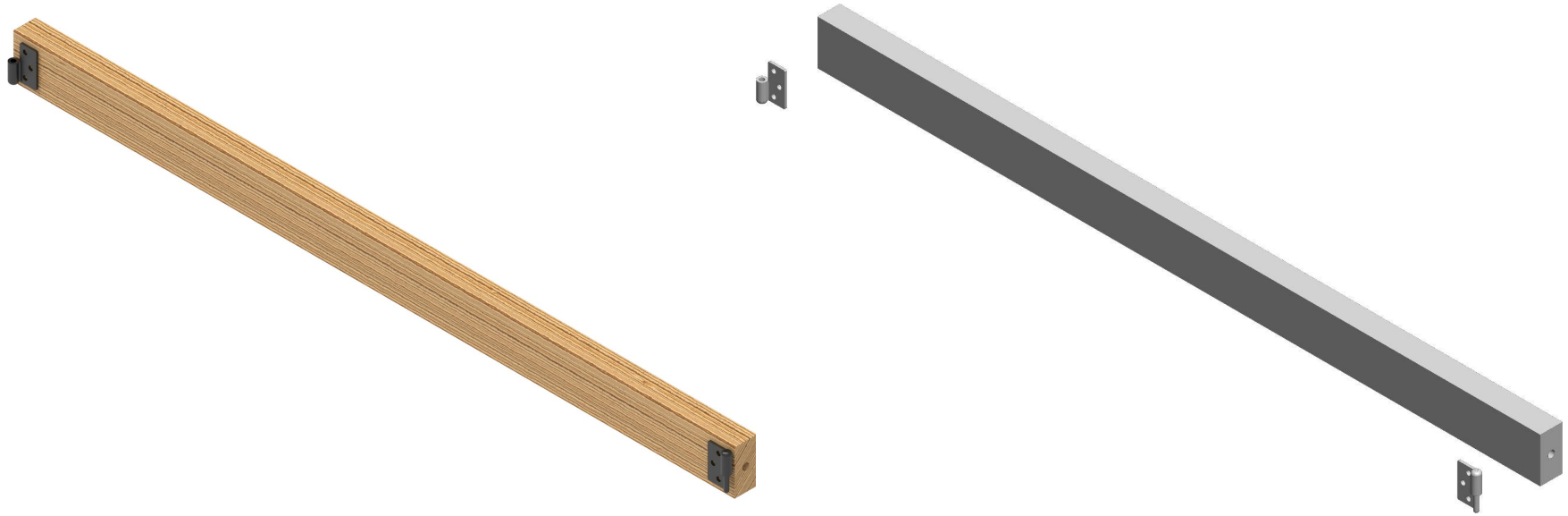


Tampak Depan

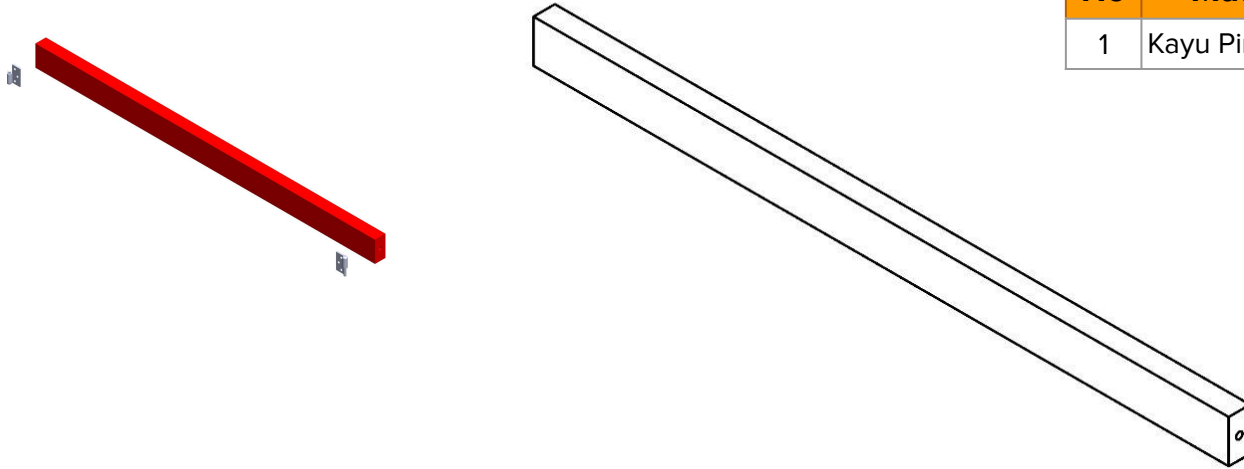


Tampak Samping

RANGKA DEPAN BAWAH & RANGKA BELAKANG BAWAH - E



RANGKA DEPAN BAWAH - E



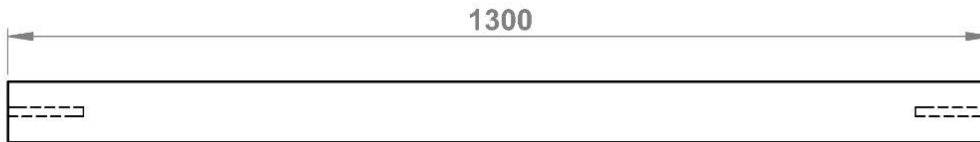
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	1300 x 80 x 40	1 buah

No	Peralatan
1	Gergaji
2	Bor duduk

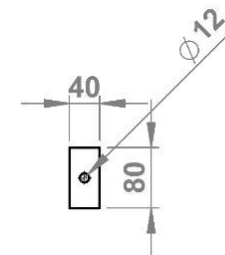
Skala 1:10
Satuan: milimeter



Tampak Atas

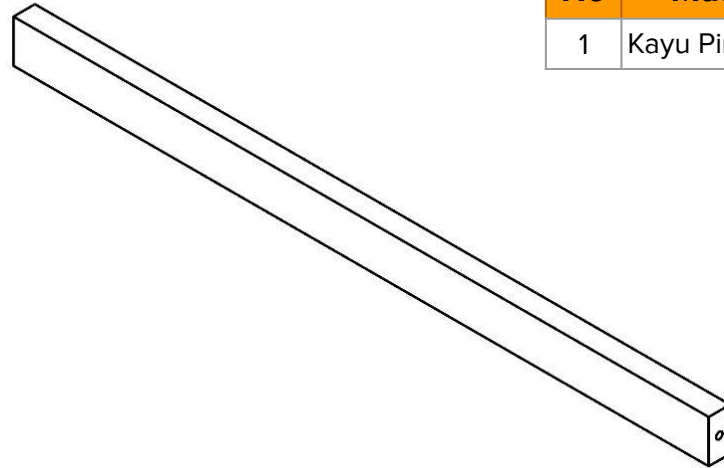
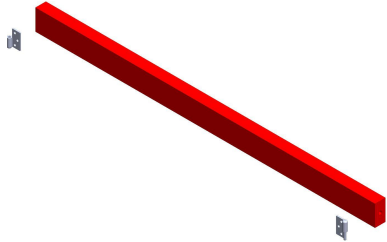


Tampak Depan



Tampak Samping

RANGKA BELAKANG BAWAH - E



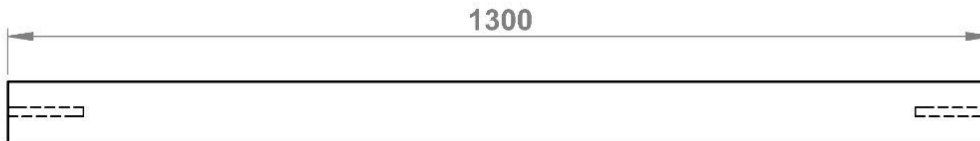
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	1300 x 80 x 40	1 buah

No	Peralatan
1	Gergaji
2	Bor duduk

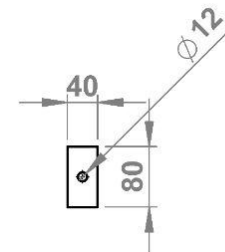
Skala 1:10
Satuan: milimeter



Tampak Atas

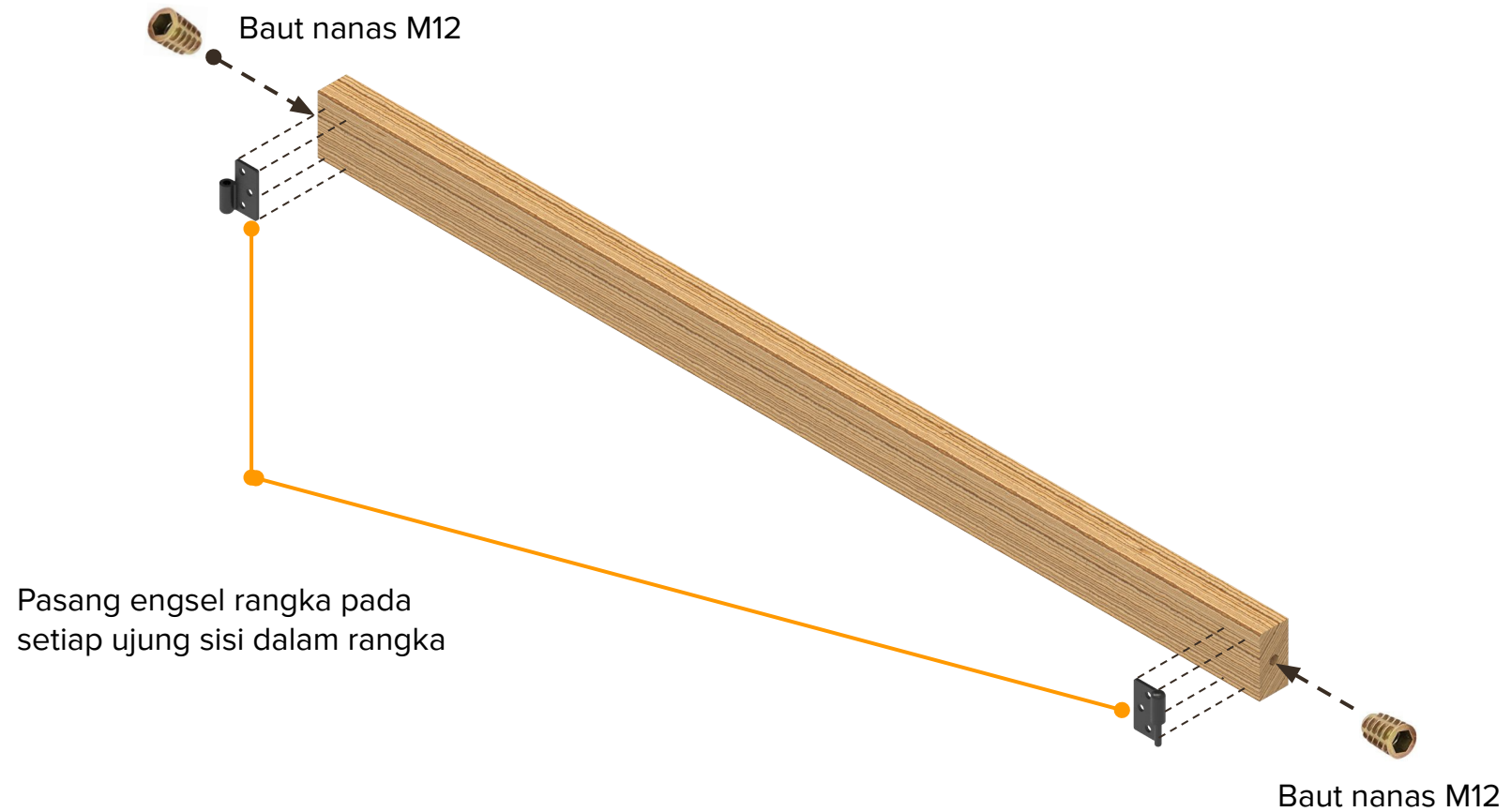


Tampak Depan



Tampak Samping

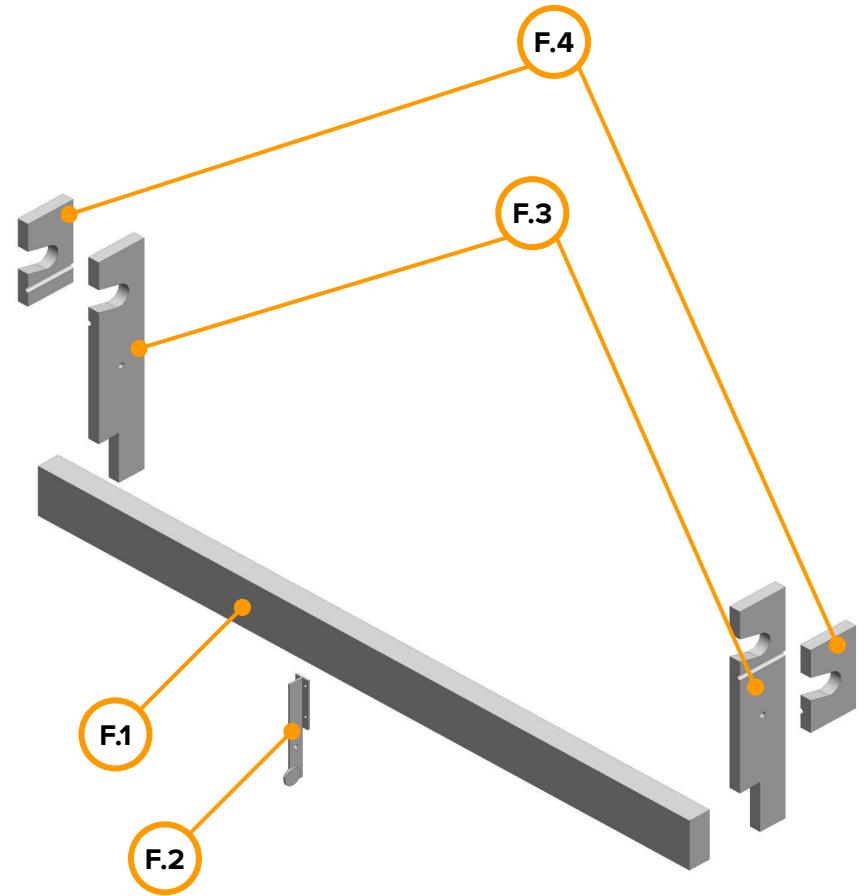
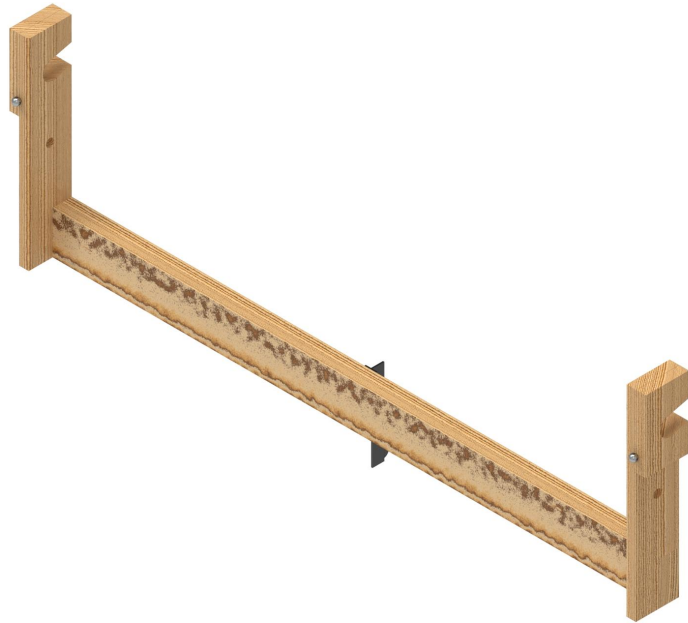
RANGKA DEPAN BAWAH DAN RANGKA BELAKANG BAWAH (PERAKITAN)



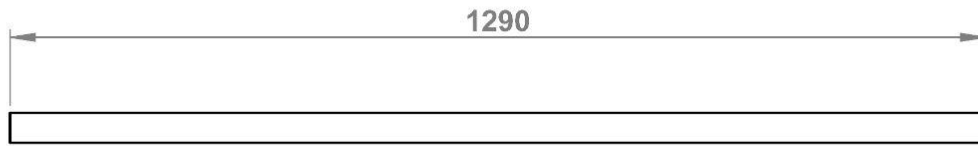
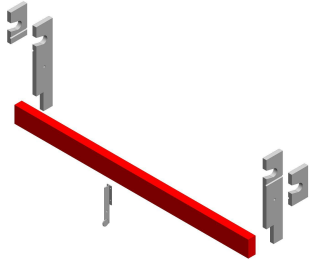
A close-up photograph of a wooden mechanical assembly. A white PVC pipe is inserted into a vertical wooden post. A metal spring is attached to the post and a horizontal wooden beam. The spring is coiled and has a small metal ring at its base. The wooden beams are joined with metal brackets and screws. The background is a plain, light-colored wall.

LENGAN GERAK

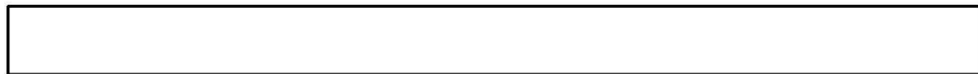
LENGAN GERAK - F



LENGAN GERAK - F.1



Tampak Atas

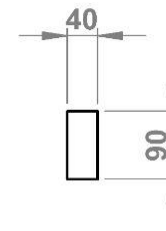
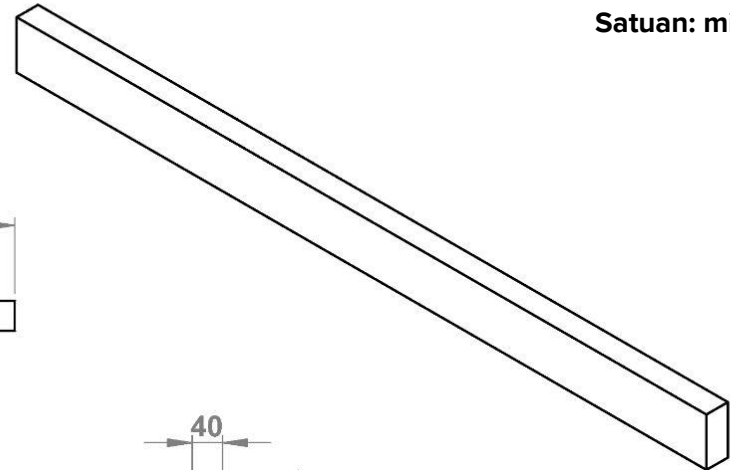


Tampak Depan

No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	1290 x 90 x 40	1 buah

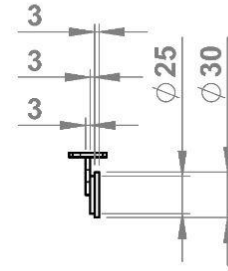
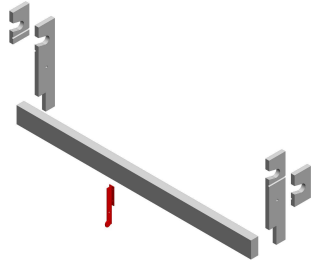
No	Peralatan
1	Gergaji

Skala 1:10
Satuan: milimeter

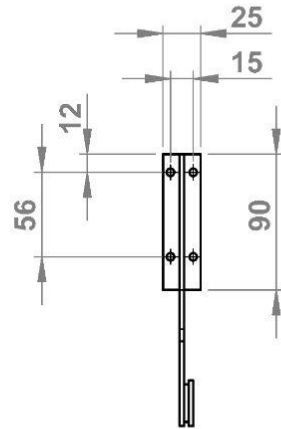
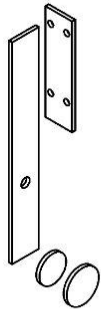


Tampak Samping

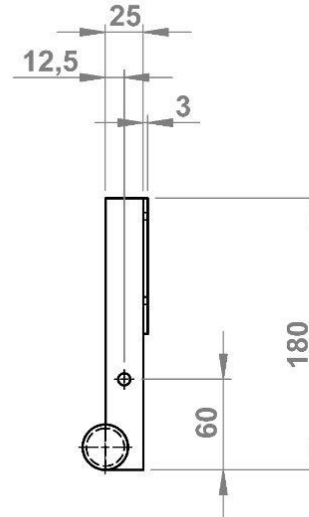
BESI LENGAN GERAK - F.2



Tampak Atas



Tampak Samping



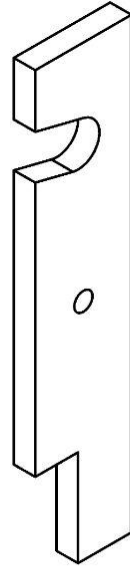
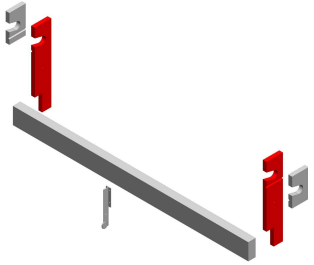
Tampak Depan

No	Material	Ukuran (mm)	Jumlah
1	Plat besi 3mm		

No	Peralatan
1	Gerinda potong besi
2	Mesin las
3	Kompresor angin
4	Spray gun cat

Skala 1:5
Satuan: milimeter

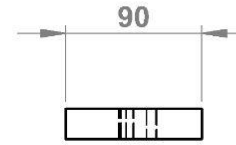
LENGAN GERAK - F.3



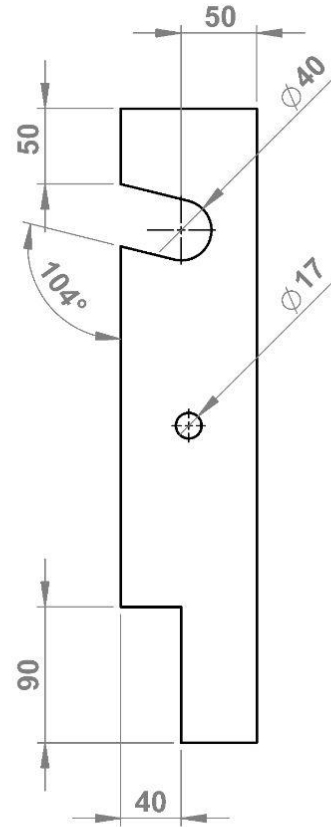
No	Peralatan
1	Gergaji
2	Router
3	Alat pahat kayu
4	Palu

Skala 1:10
Satuan: milimeter

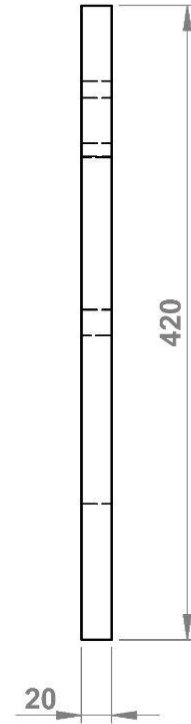
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	420 x 90 x 20	2 buah



Tampak Atas

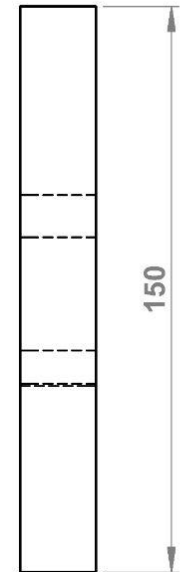
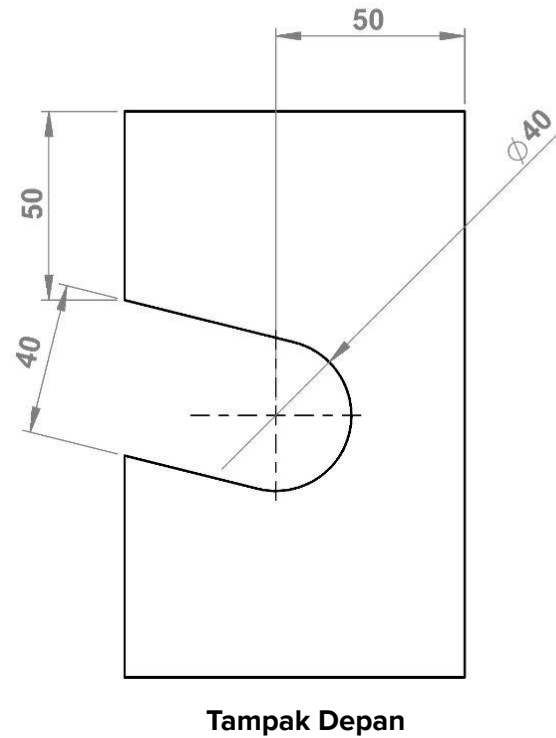
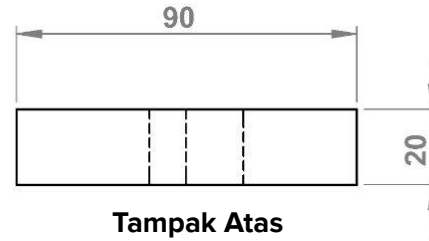
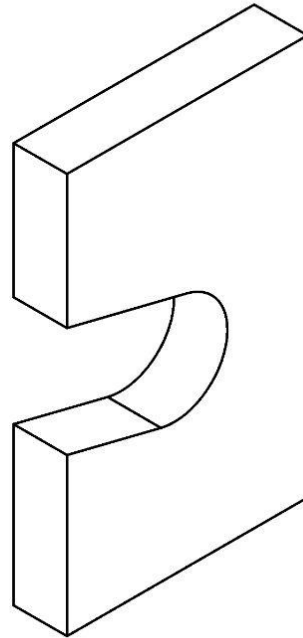
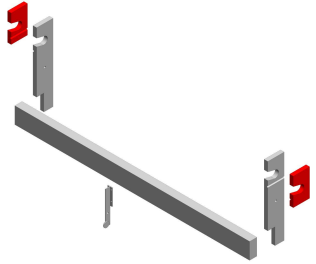


Tampak Depan



Tampak Samping

LENGAN GERAK - F.4

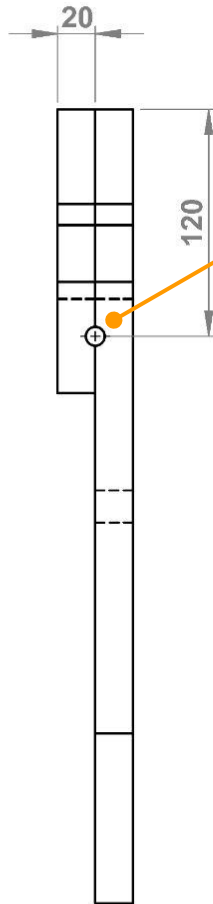
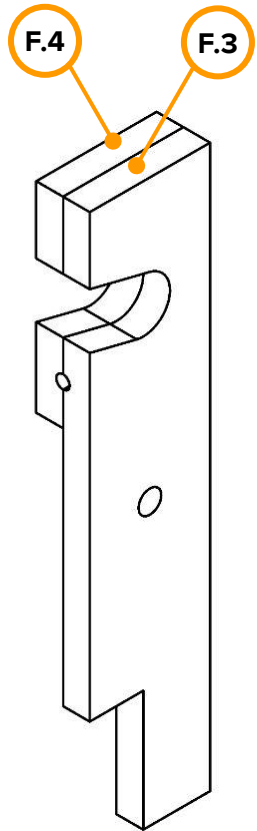


No	Peralatan
1	Gergaji
2	Router
3	Alat pahat kayu
4	Palu

Skala 1:2
Satuan: milimeter

No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	150 x 90 x 20	2 buah

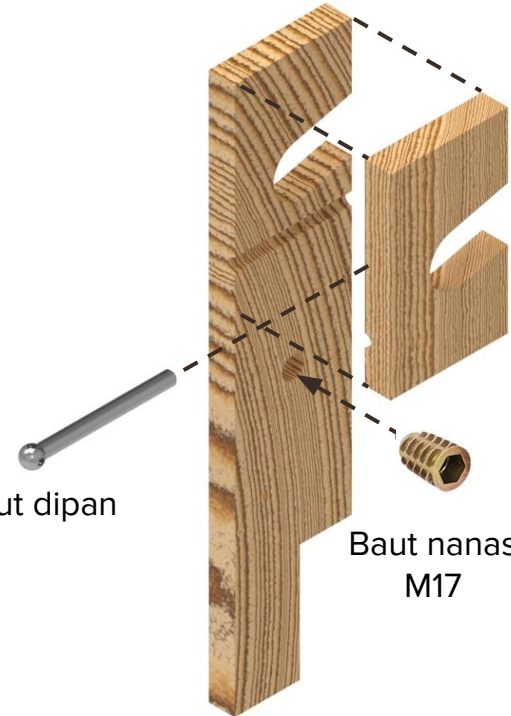
LENGAN GERAK - PERAKITAN



Setelah komponen F.3 dan F.4 disatukan, buat lubang menggunakan bor di tengah-tengah kedua komponen



Baut dipan

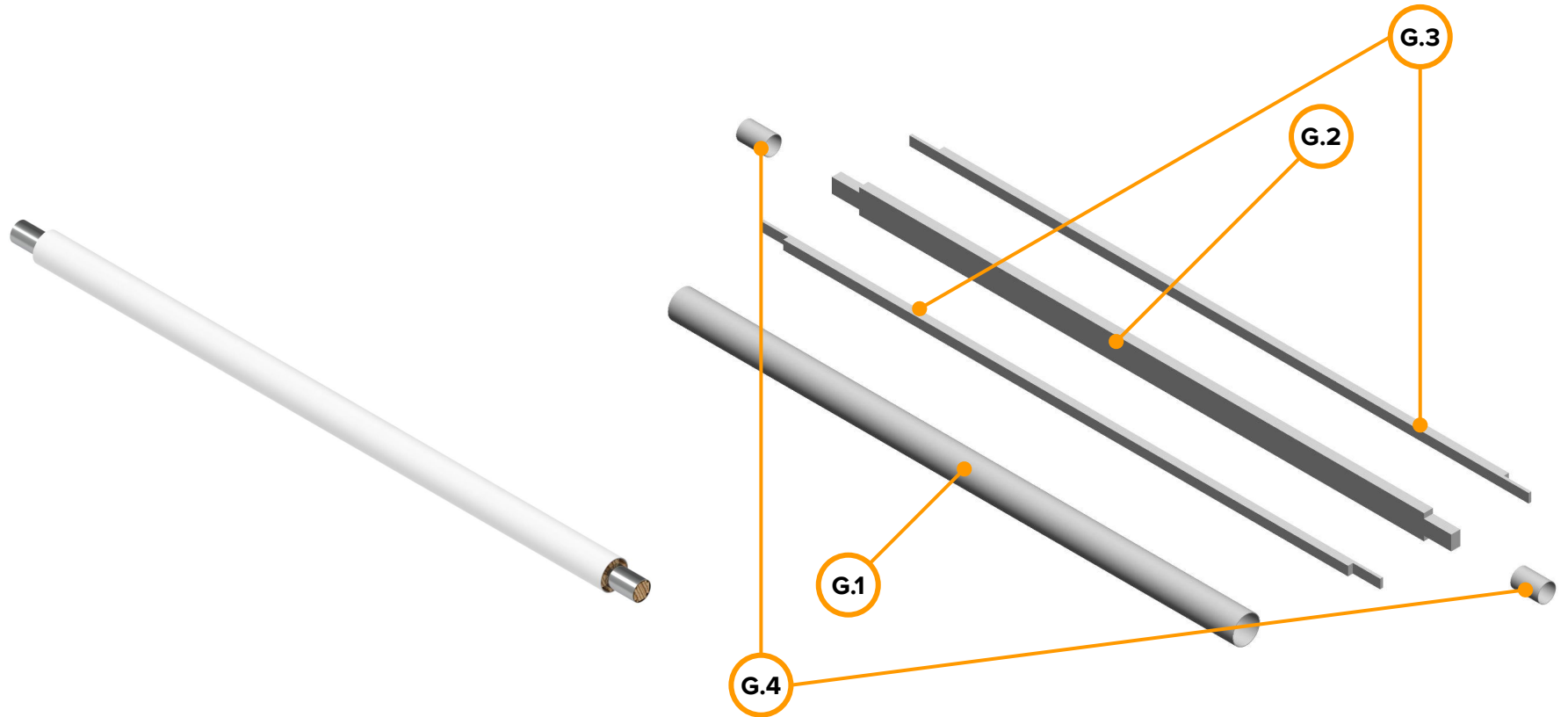


Baut nanas M17

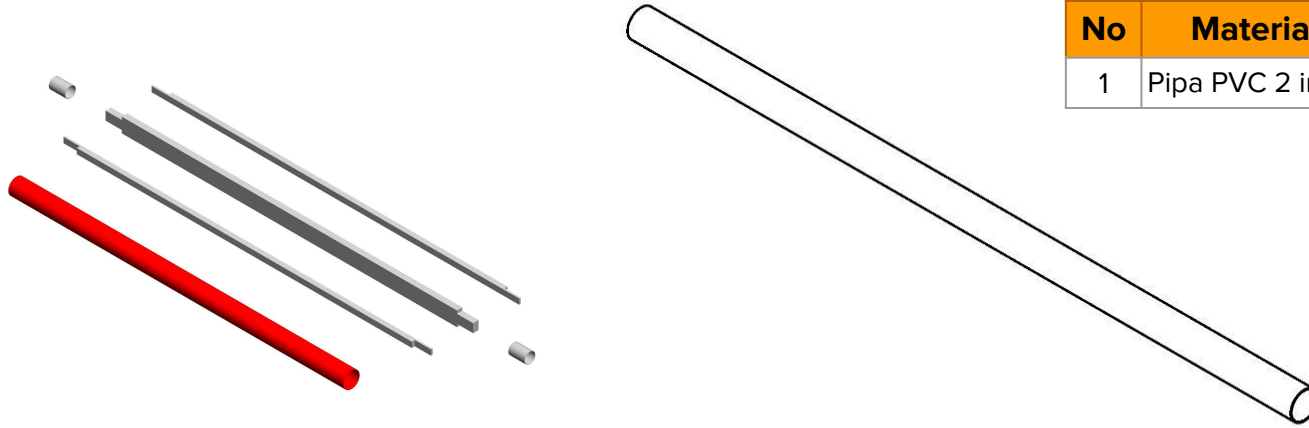
A close-up photograph of a wooden post assembly. The post is made of light-colored wood and has three rectangular wooden blocks stacked vertically. A white rope with blue stripes is wrapped around the middle block. A metal spring is attached to the bottom block, extending downwards and to the right. The background is blurred, showing a white structure and some greenery.

**LUNGSU DEPAN &
LUNGSU BELAKANG**

LUNGSU DEPAN - G



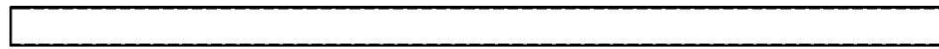
LUNGSU DEPAN - G.1



No	Material	Ukuran (mm)	Jumlah
1	Pipa PVC 2 inch	1240 x 50,8 x 50,8	1 buah

No	Peralatan
1	Gergaji besi

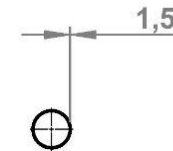
Skala 1:10
Satuan: milimeter



Tampak Atas

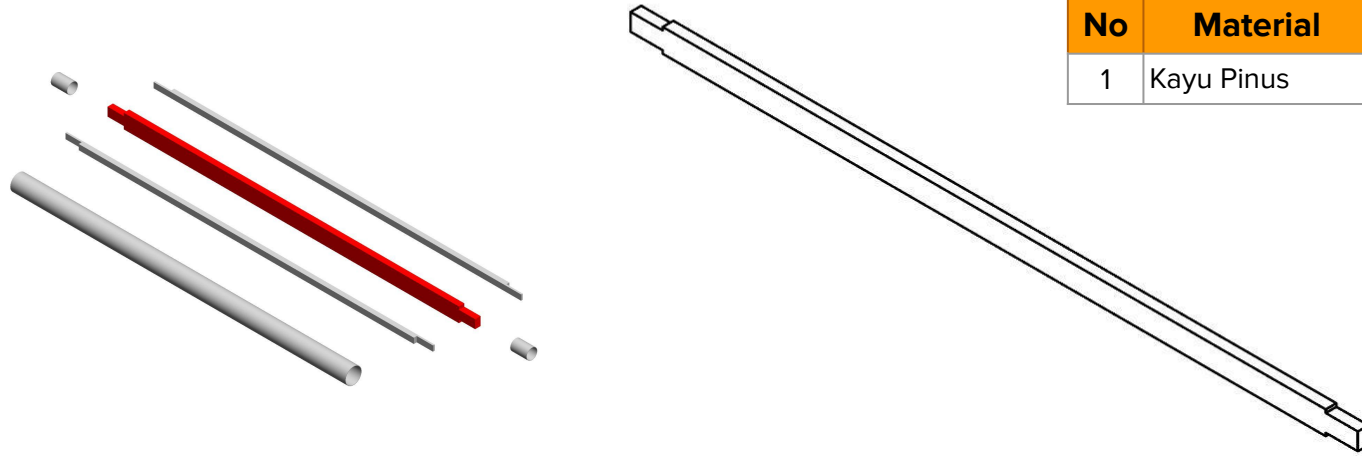


Tampak Depan



Tampak Samping

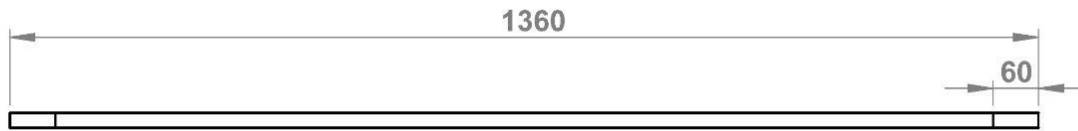
LUNGSU DEPAN - G.2



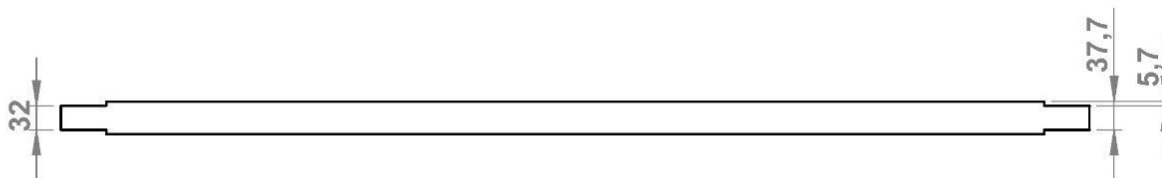
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	1360 x 20 x 43	1 buah

No	Peralatan
1	Gergaji
2	Alat pahat kayu
3	Palu

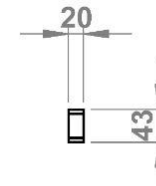
Skala 1:10
Satuan: milimeter



Tampak Atas

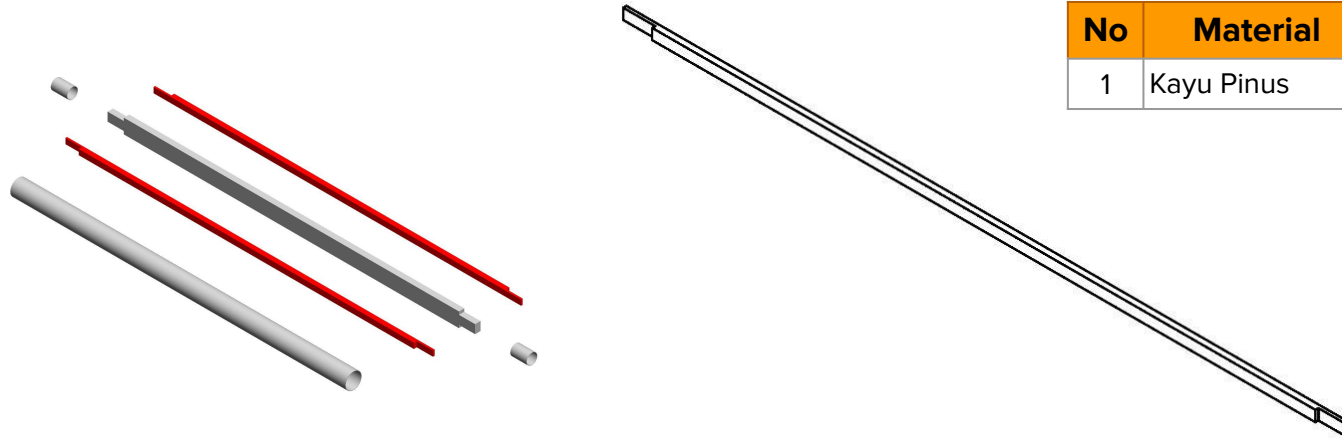


Tampak Depan



Tampak Samping

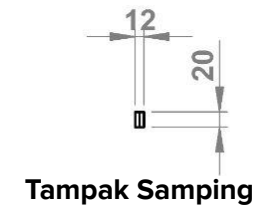
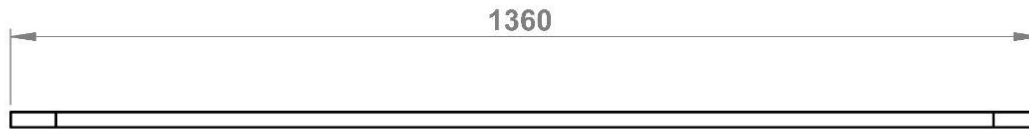
LUNGSU DEPAN - G.3



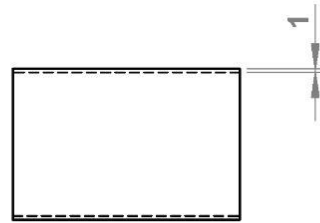
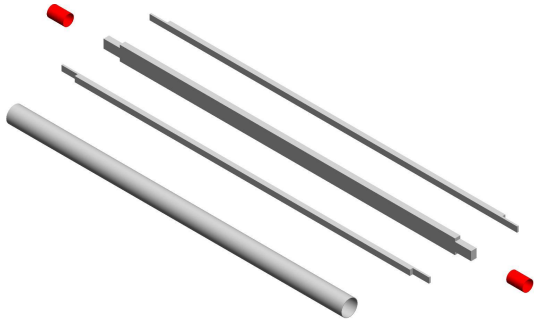
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	1360 x 12 x 20	2 buah

No	Peralatan
1	Gergaji
2	Alat pahat kayu
3	Palu

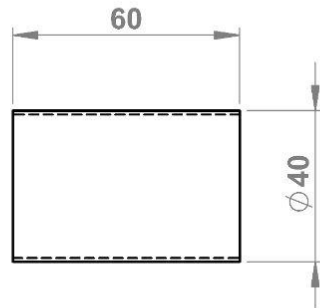
Skala 1:10
Satuan: milimeter



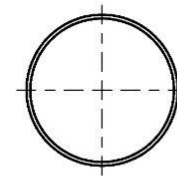
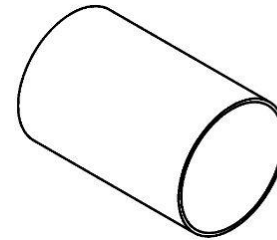
LUNGSU DEPAN - G.4



Tampak Atas



Tampak Depan



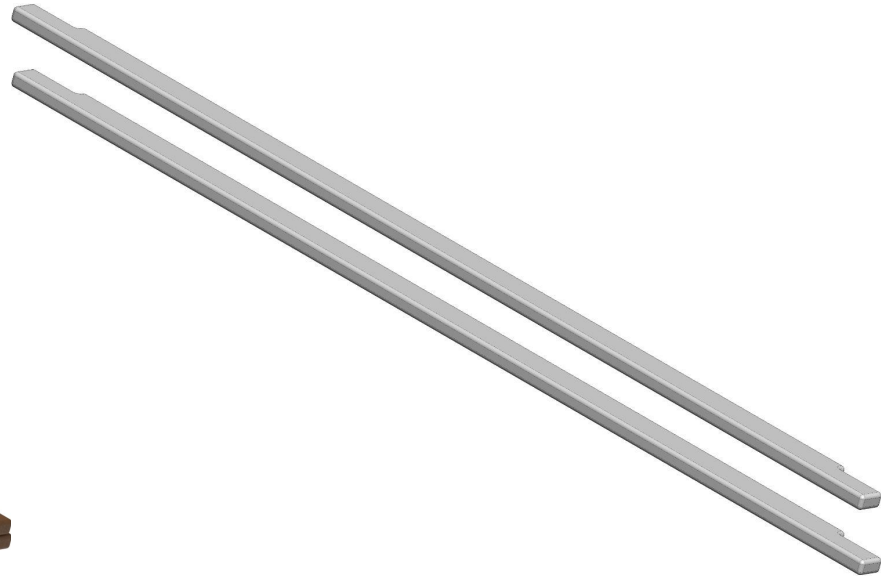
Tampak Samping

No	Material	Ukuran (mm)	Jumlah
1	Pipa Besi	40 x 60	2 buah

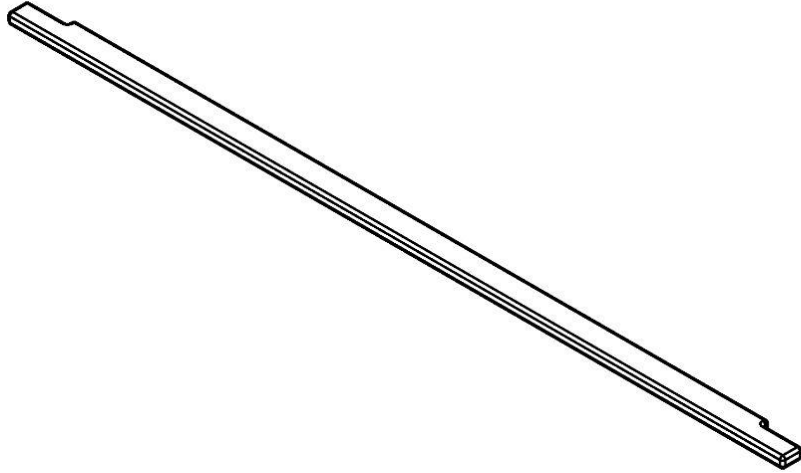
No	Peralatan
1	Gergaji besi

Skala 1:2
Satuan: milimeter

LUNGSU BELAKANG - H



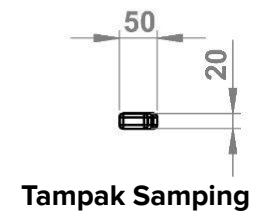
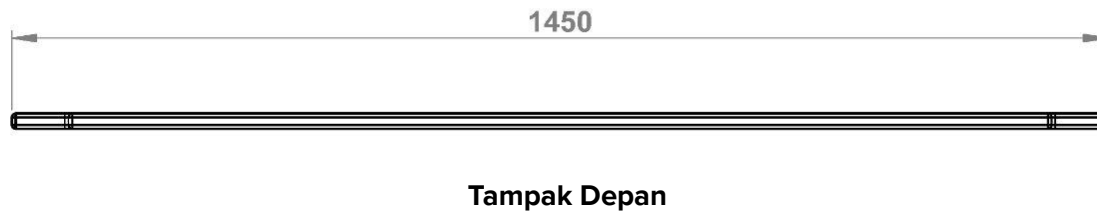
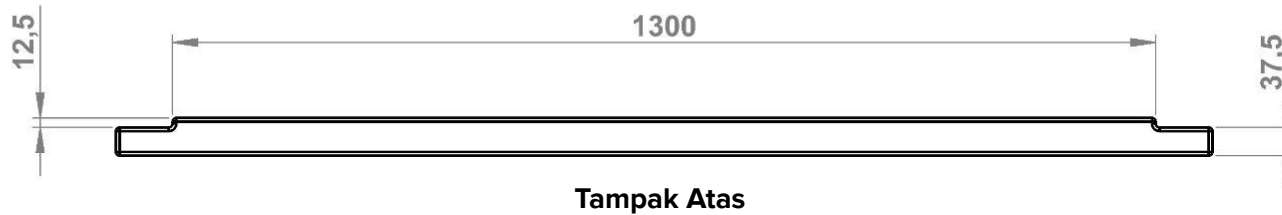
LUNGSU BELAKANG - H



No	Material	Ukuran (mm)	Jumlah
1	Kayu Kelapa	1450 x 50 x 20	2 buah

No	Peralatan
1	Gergaji
2	Alat pahat kayu
3	Palu

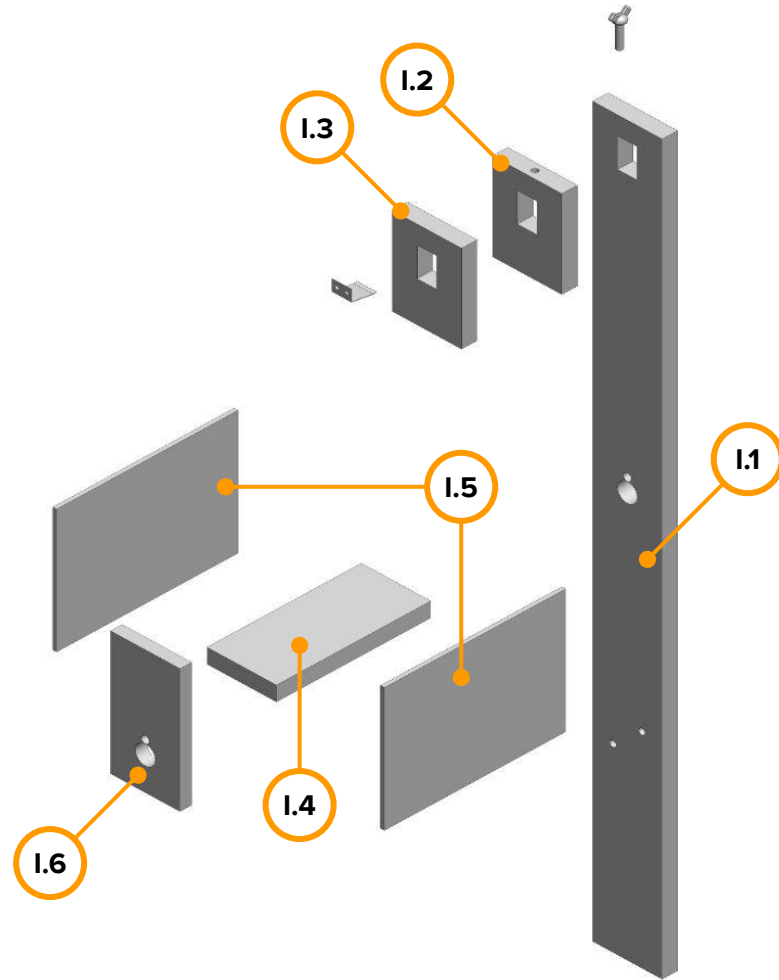
Skala 1:10
Satuan: milimeter



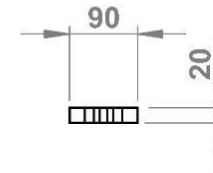
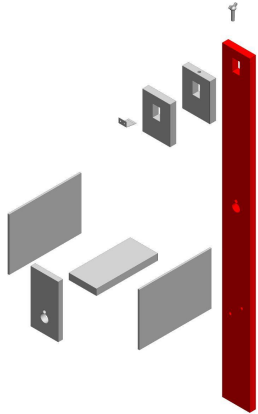
TIANG NEKET



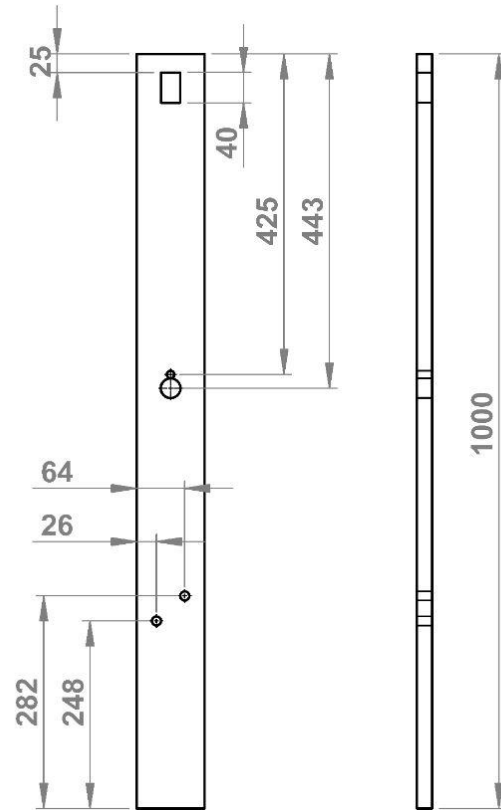
TIANG NEKET - I



TIANG NEKET - I.1

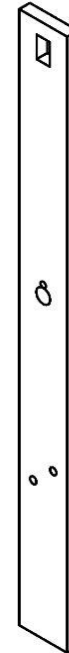


Tampak Atas



Tampak Depan

Tampak Samping

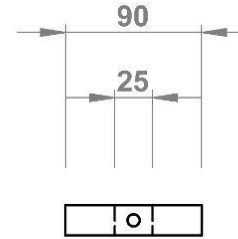
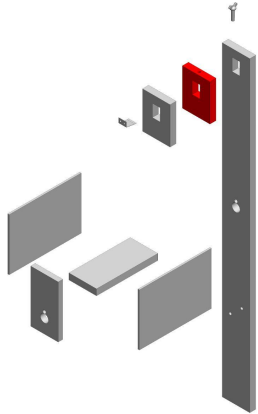


No	Peralatan
1	Gergaji
2	Router
3	Alat pahat kayu
4	Palu

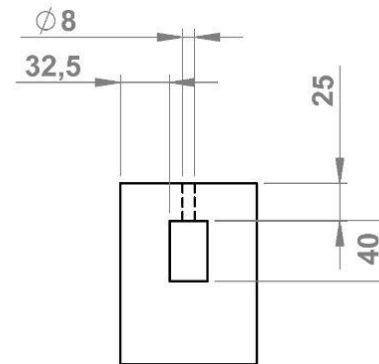
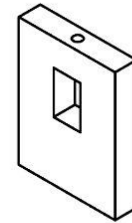
Skala 1:10
Satuan: milimeter

No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	1000 x 90 x 20	1 buah

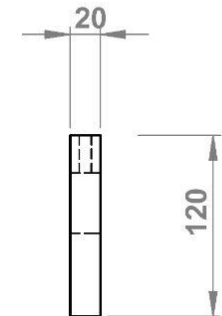
TIANG NEKET - I.2



Tampak Atas



Tampak Depan



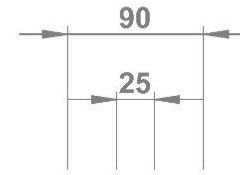
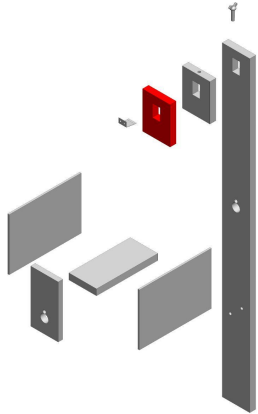
Tampak Samping

No	Peralatan
1	Gergaji kayu
2	Router
3	Alat pahat kayu
4	Palu

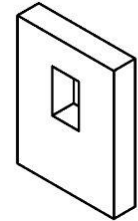
Skala 1:5
Satuan: milimeter

No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	120 x 90 x 20	1 buah

TIANG NEKET - I.3

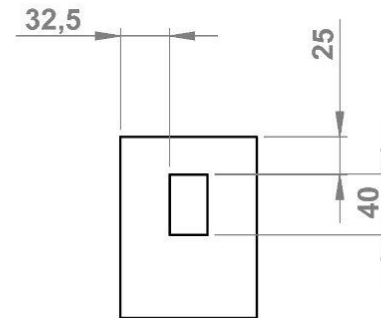


Tampak Atas

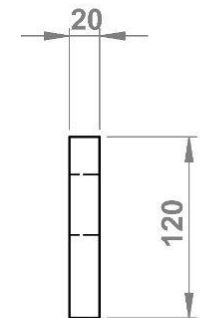


No	Peralatan
1	Gergaji kayu
2	Router
3	Alat pahat kayu
4	Palu

Skala 1:5
Satuan: milimeter



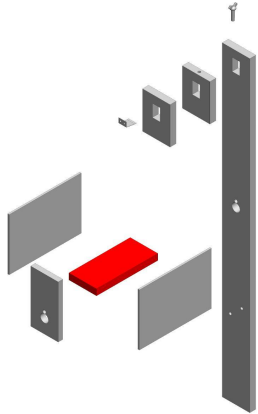
Tampak Depan



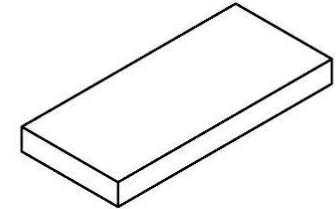
Tampak Samping

No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	150 x 90 x 20	1 buah

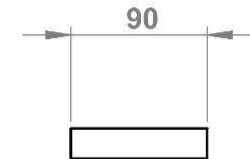
TIANG NEKET - I.4



Tampak Atas



Tampak Depan



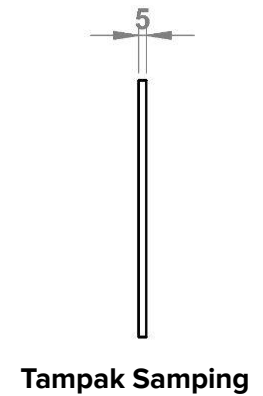
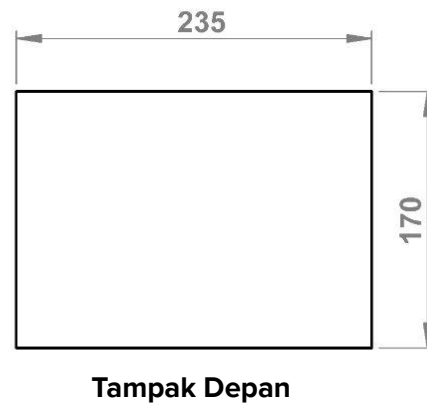
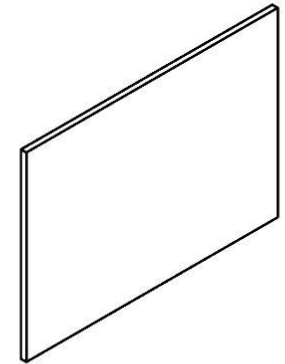
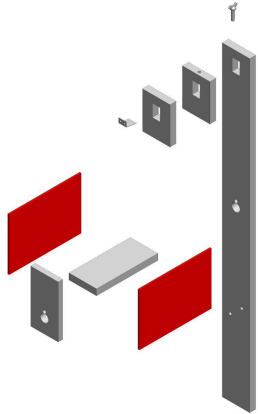
Tampak Samping

No	Peralatan
1	Gergaji kayu

Skala 1:5
Satuan: milimeter

No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	150 x 90 x 20	1 buah

TIANG NEKET - I.5

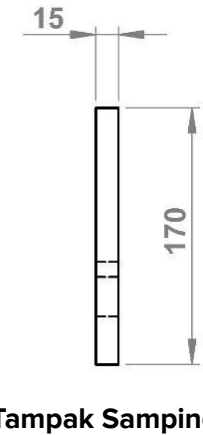
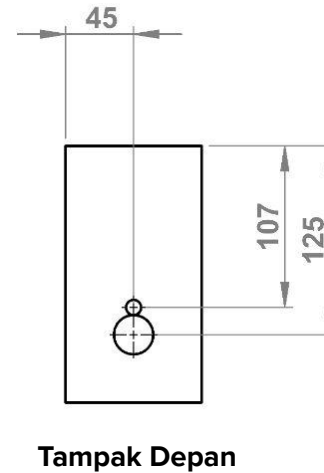
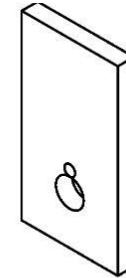
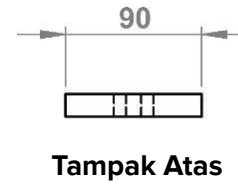
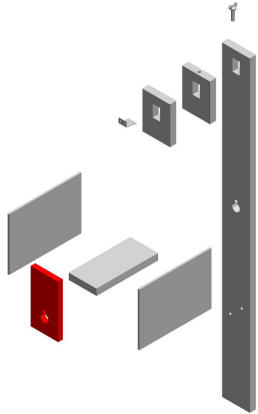


No	Peralatan
1	Gergaji kayu

Skala 1:5
Satuan: milimeter

No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	235 x 170 x 5	2 buah

TIANG NEKET - I.6

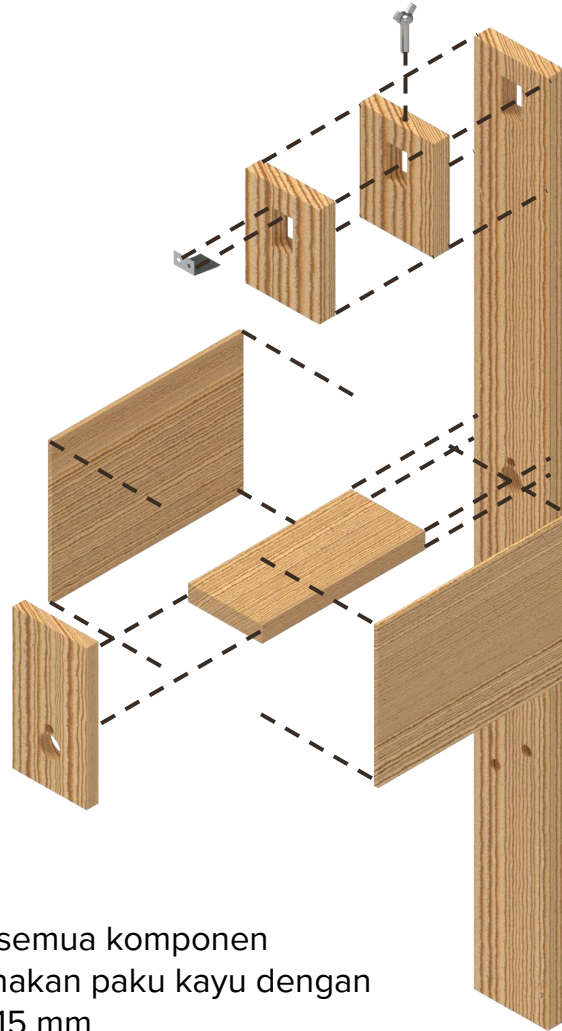


No	Peralatan
1	Gergaji
2	Bor tangan

Skala 1:5
Satuan: milimeter

No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	170 x 90 x 15	1 buah

TIANG NEKET - PERAKITAN

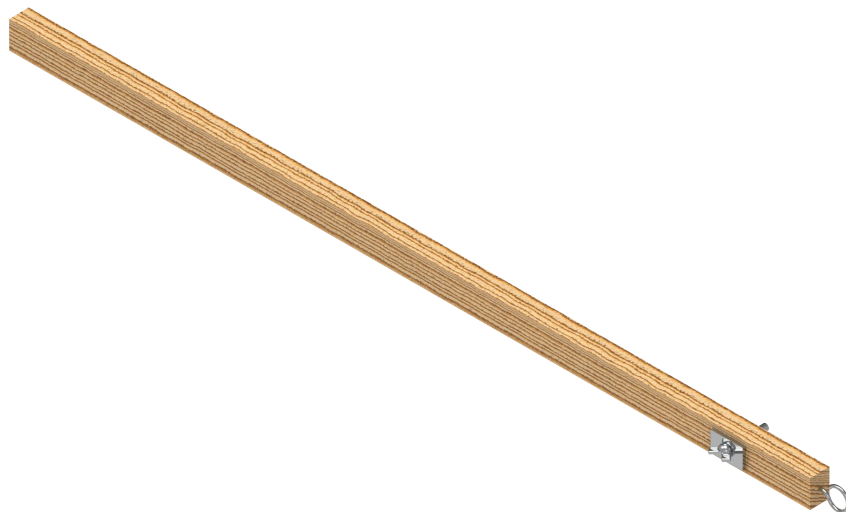


Satukan semua komponen menggunakan paku kayu dengan panjang 15 mm

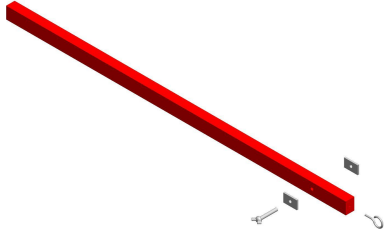


TIANG LAMPU & PIPA

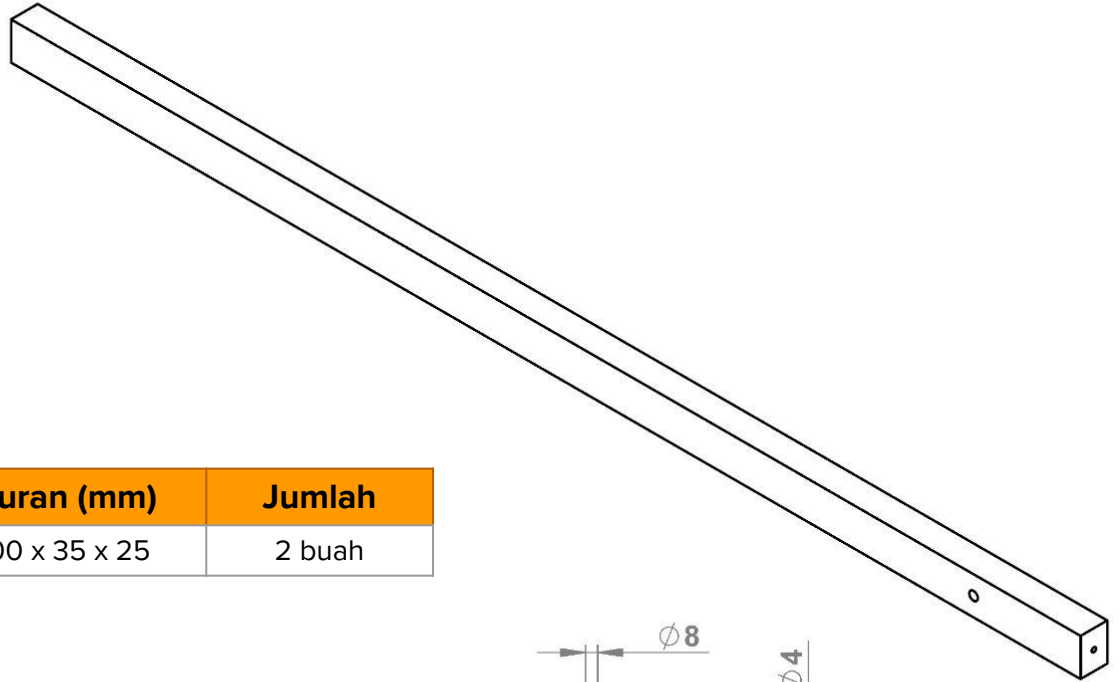
TIANG LAMPU - J



TIANG LAMPU - J

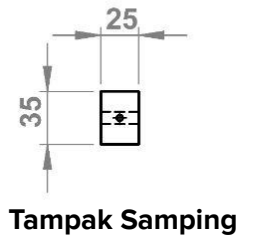
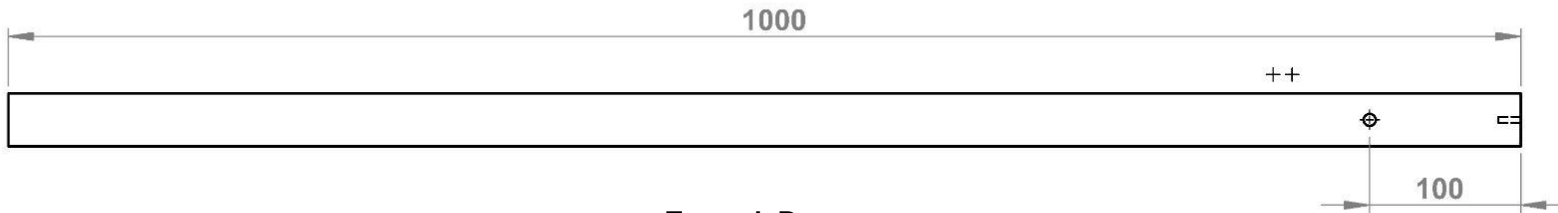
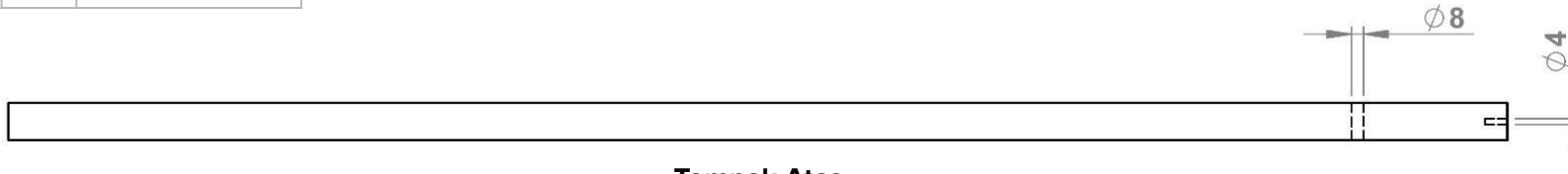


Skala 1:5
Satuan: milimeter

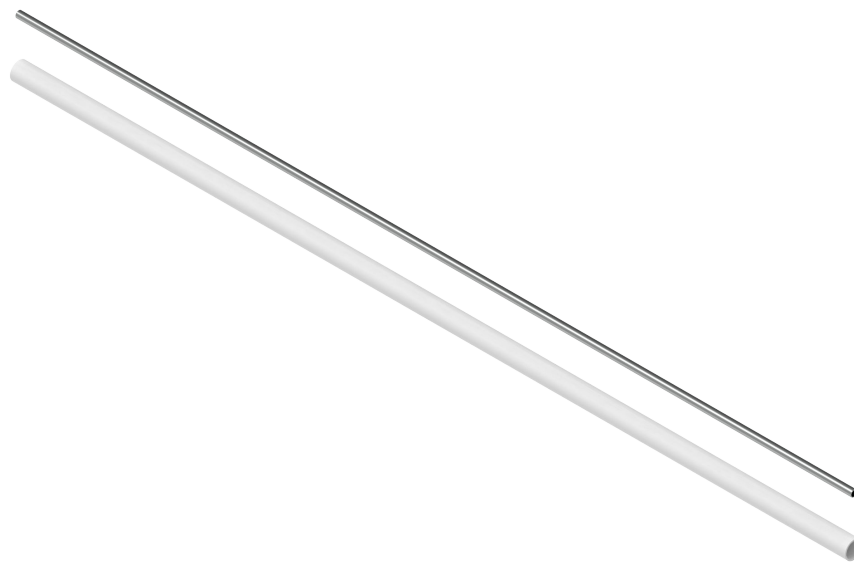


No	Peralatan
1	Gergaji
2	Bor

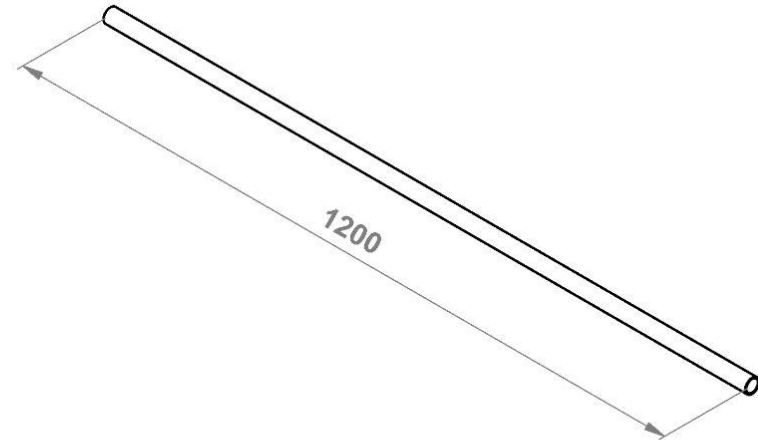
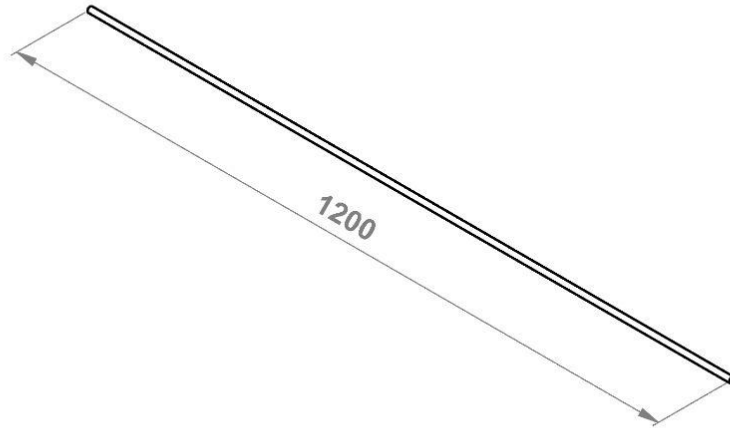
No	Material	Ukuran (mm)	Jumlah
1	Kayu Pinus	1000 x 35 x 25	2 buah



PIPA PVC & PIPA ALUMINIUM - K



PIPA PVC & PIPA ALUMINIUM - K



No	Peralatan
1	Gergaji besi

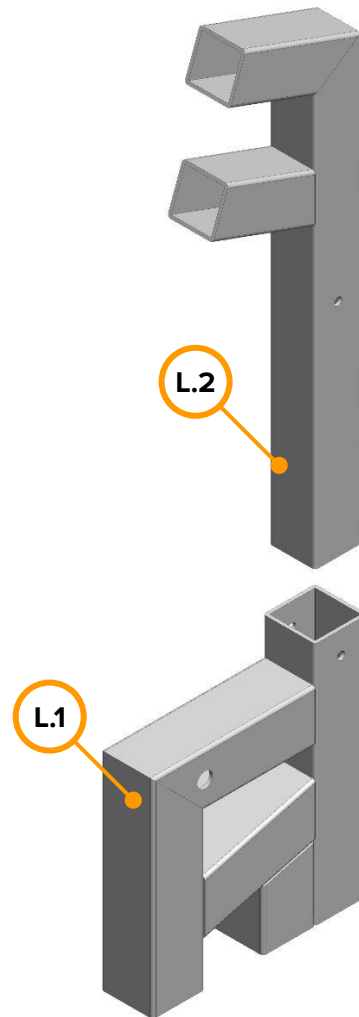
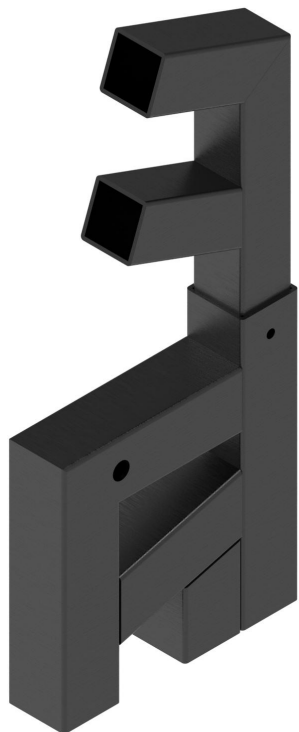
Skala 1:5
Satuan: milimeter

No	Material	Ukuran (mm)	Jumlah
1	Pipa PVC $\frac{3}{4}$ in	1200	1 buah
2	Pipa Aluminium 10 mm	1200	1 buah

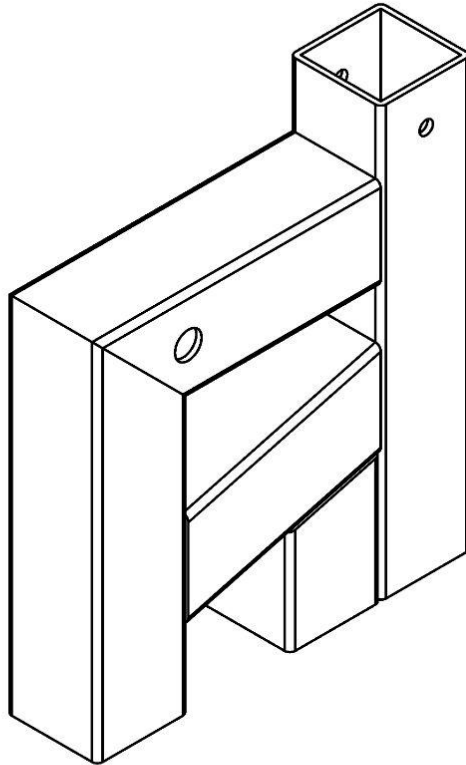


**BLOK ROTATOR &
GARPU PENGUNCI**

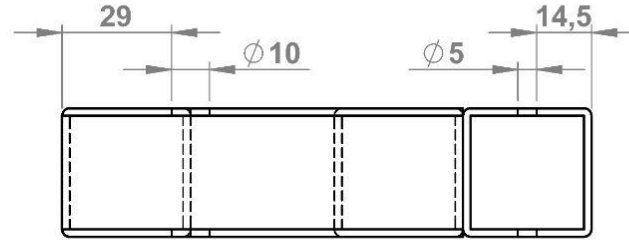
BLOK ROTATOR - L



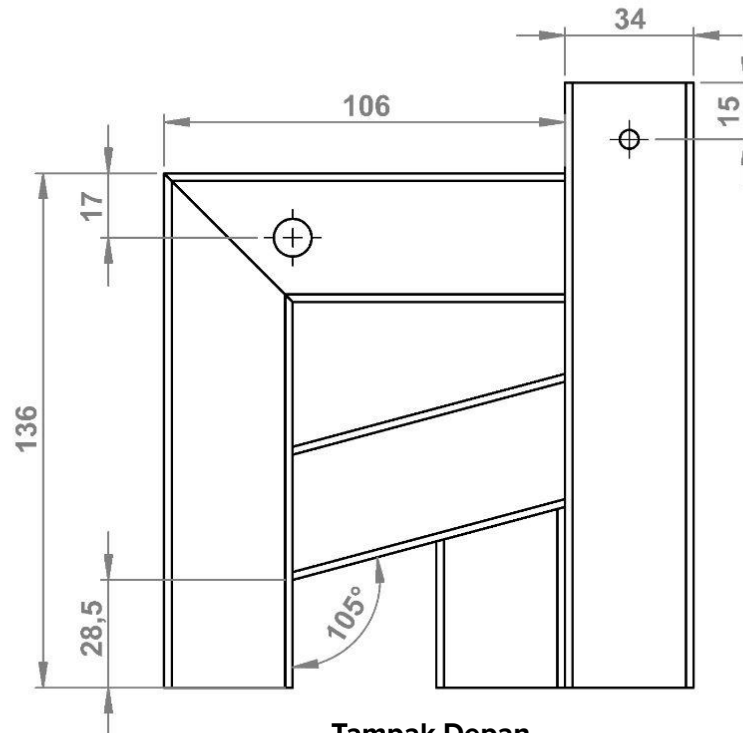
BLOK ROTATOR - L.1



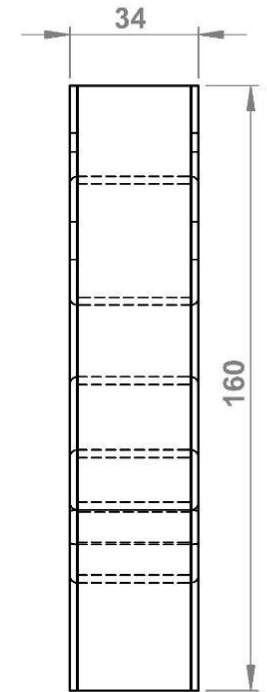
Skala 1:2
Satuan: milimeter



Tampak Atas

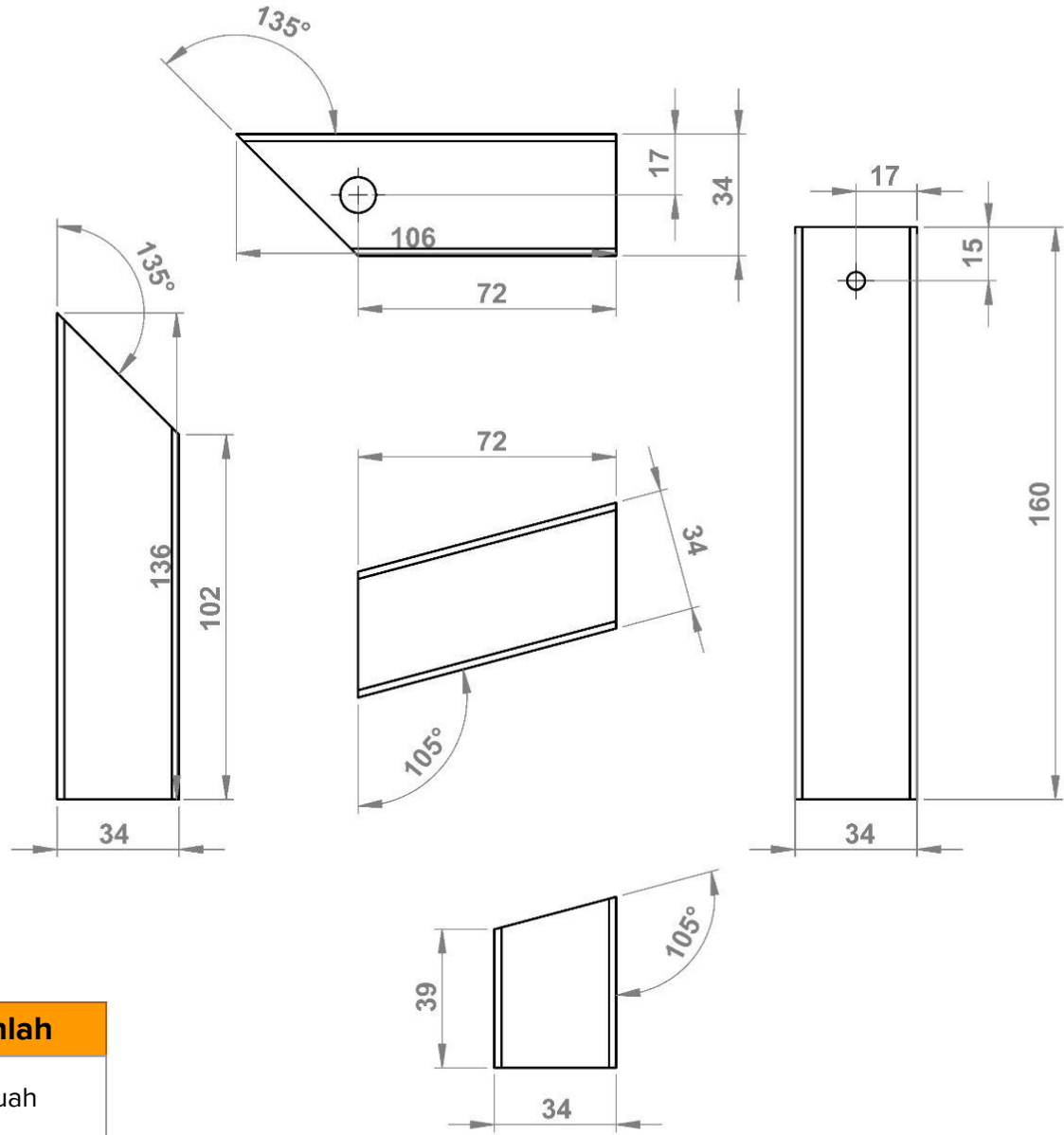


Tampak Depan



Tampak Samping

BLOK ROTATOR - L.1



No	Peralatan
1	Gerinda potong besi
2	Bor tangan
3	Busur derajat
4	Mesin las
5	Kompresor angin
6	Spray gun cat

Skala 1:2
Satuan: milimeter

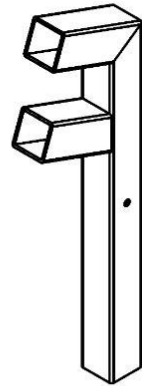
No	Material	Ukuran (mm)	Jumlah
1	Besi hollow kotak 3,4 cm	150 x 90 x 20	1 buah

Tampak Depan Elemen

BLOK ROTATOR - L.2

No	Peralatan
1	Gerinda potong besi
2	Bor tangan
3	Busur derajat
4	Mesin las
5	Kompresor angin
6	<i>Spray gun</i> cat

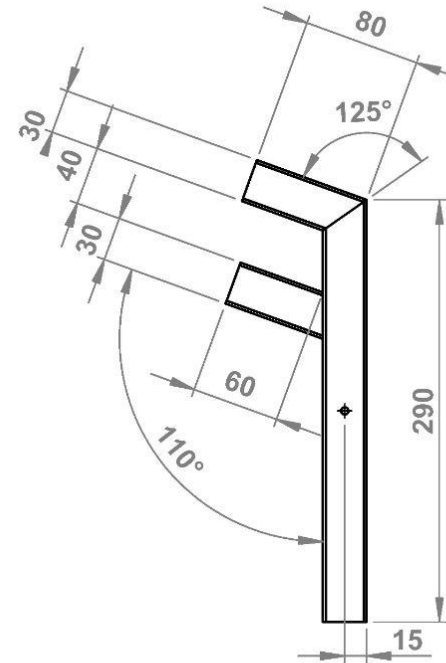
Skala 1:5
Satuan: milimeter



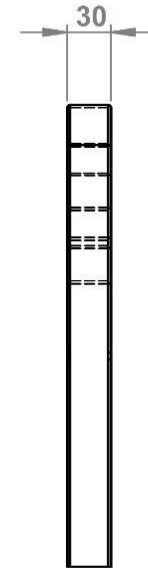
No	Material	Ukuran (mm)	Jumlah
1	Besi hollow kotak 3 cm	150 x 90 x 20	1 buah



Tampak Atas

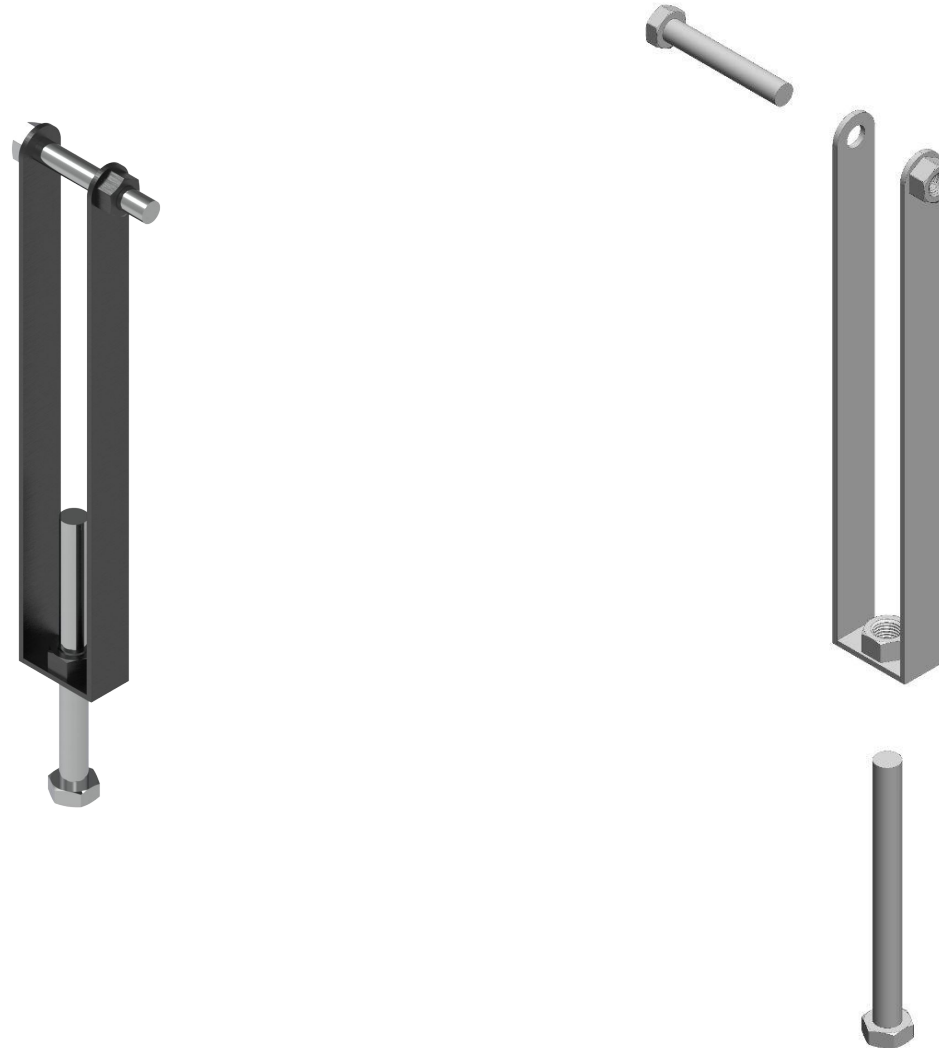


Tampak Depan

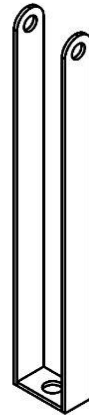
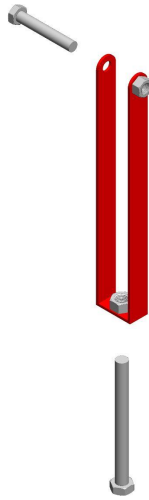


Tampak Samping

GARPU PENGUNCI - M



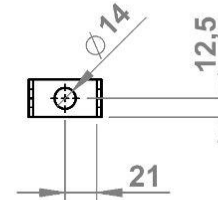
GARPU PENGUNCI - M



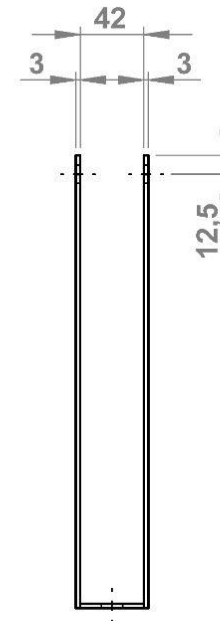
No	Peralatan
1	Gerinda potong besi
2	Bor tangan
3	Busur derajat
4	Mesin las
5	Kompresor angin
6	Spray gun cat

Skala 1:5
Satuan: milimeter

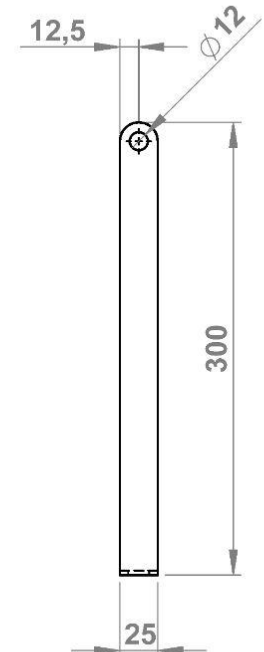
No	Material	Ukuran (mm)	Jumlah
1	Plat besi ketebalan 3 mm	642 x 25 x 3	2 buah



Tampak Atas

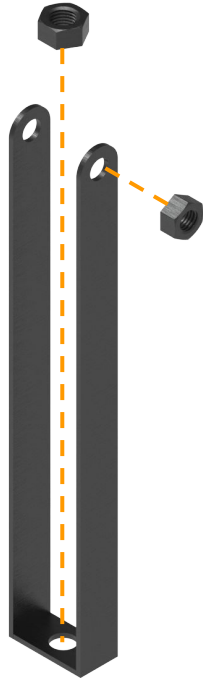


Tampak Depan



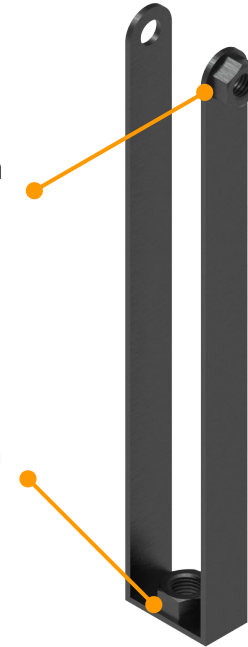
Tampak Samping

GARPU PENGUNCI - PERAKITAN



Mur M12 di las pada garpu pengunci

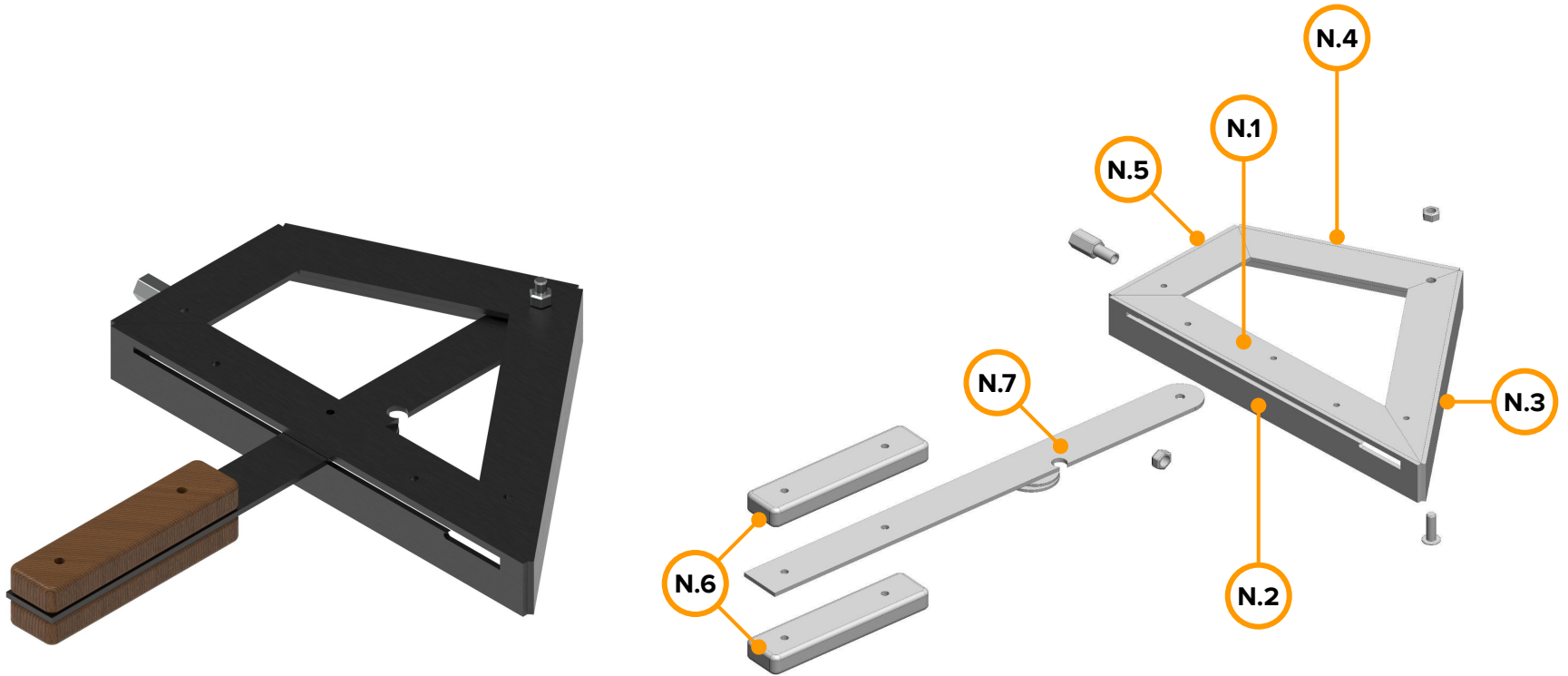
Mur M14 di las pada garpu pengunci



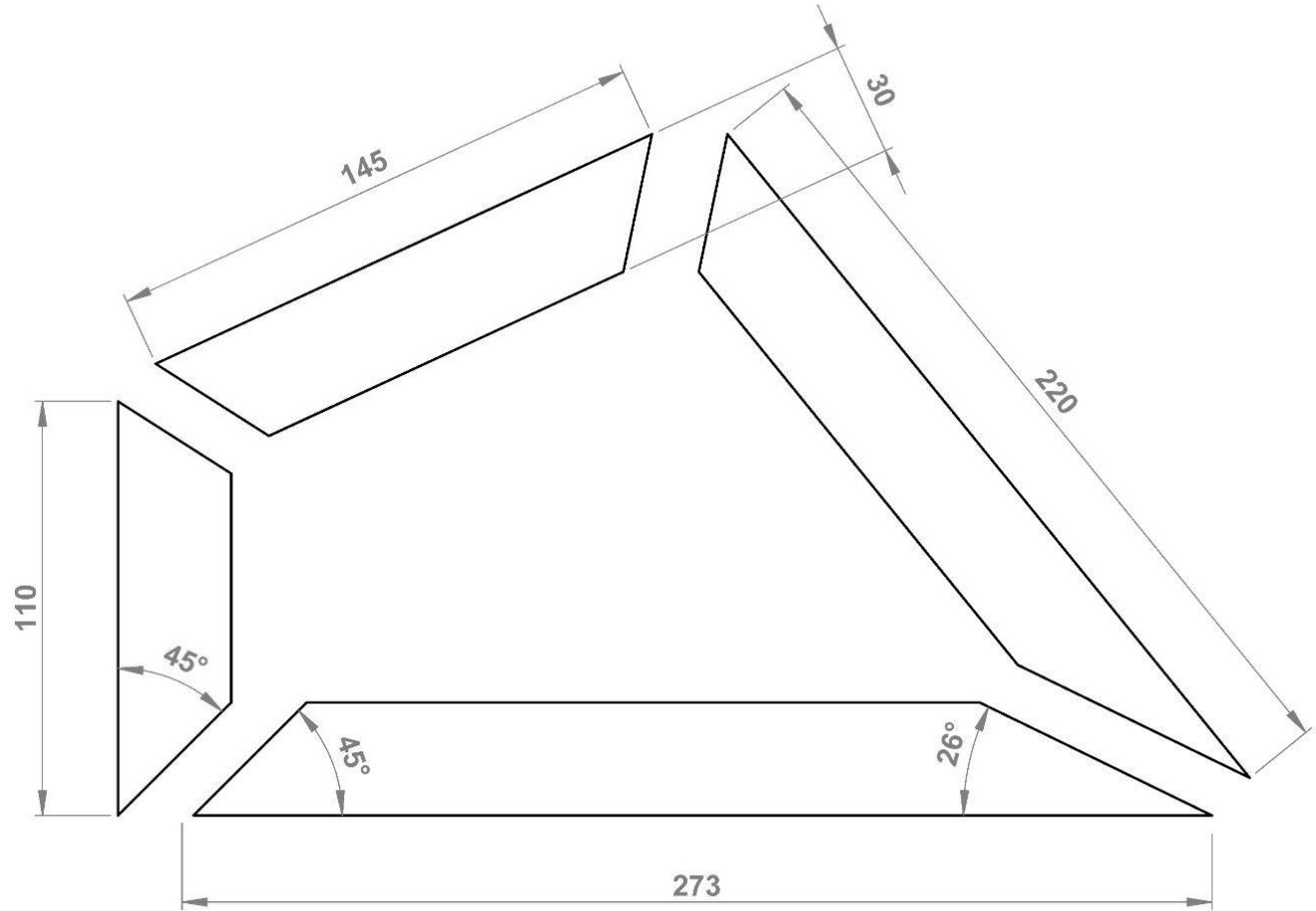
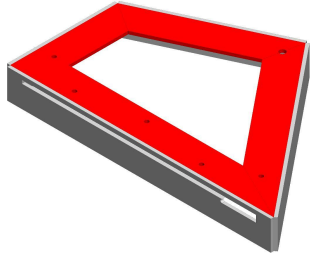


TUAS SET

TUAS SET - N



TUAS SET - N.1

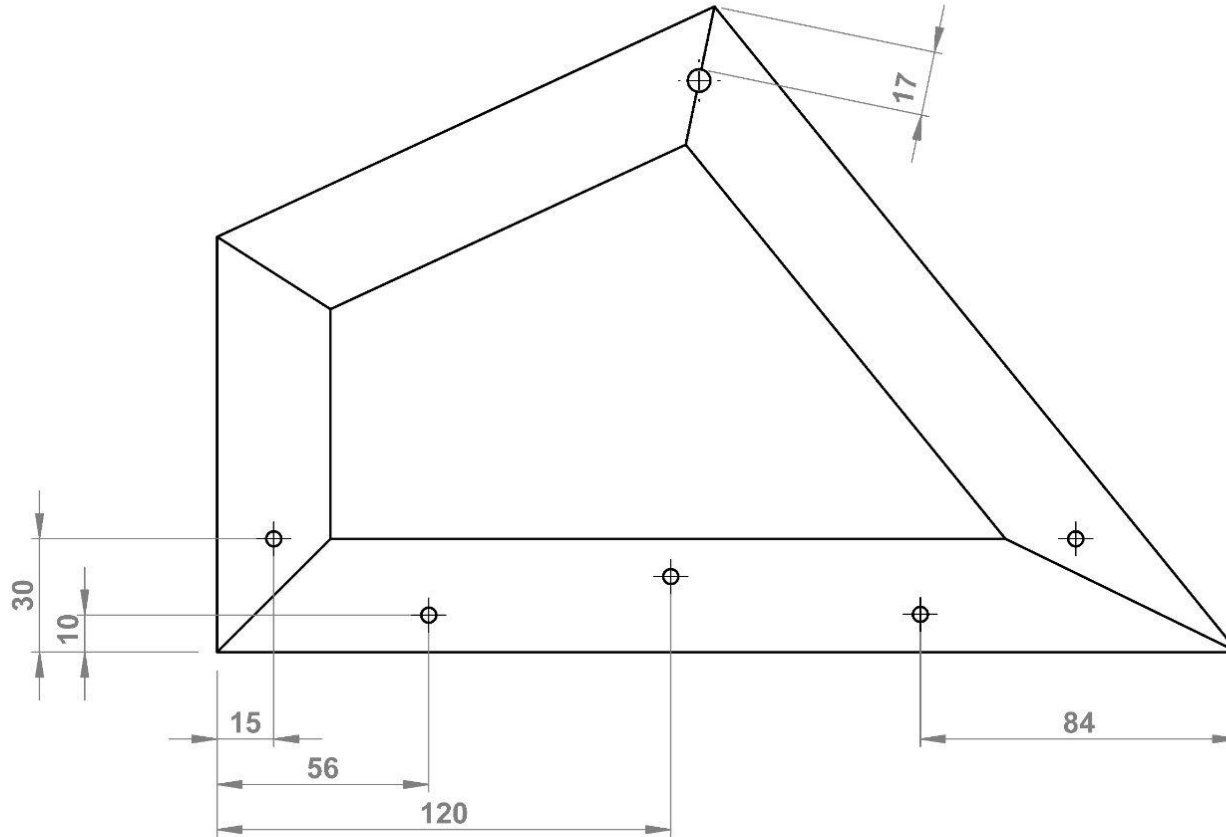
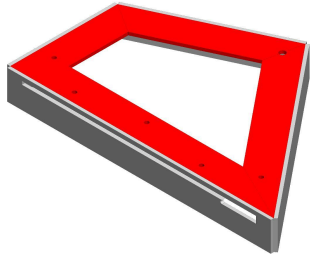


Skala 1:2
Satuan: milimeter

No	Peralatan
1	Gerinda potong besi
2	Bor tangan
3	Busur derajat
4	Mesin las
5	Kompresor angin
6	Spray gun cat

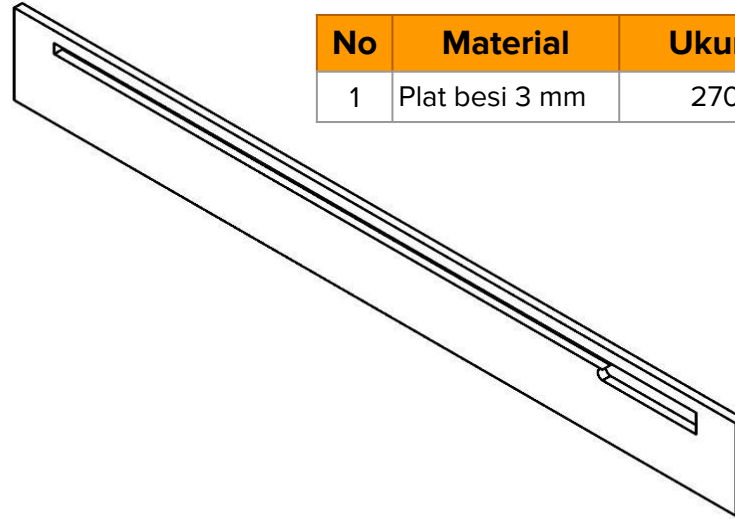
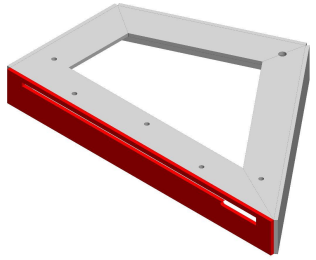
No	Material	Ukuran (mm)	Jumlah
1	Plat besi ketebalan 3 mm	649 x 30 x 3	1 buah

TUAS SET - N.1



Skala 1:2
Satuan: milimeter

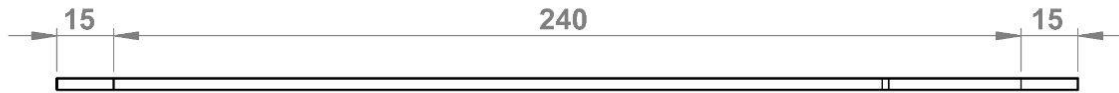
TUAS SET - N.2



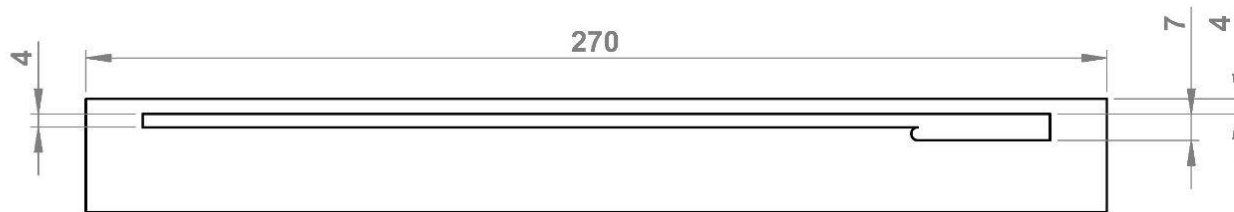
No	Material	Ukuran (mm)	Jumlah
1	Plat besi 3 mm	270 x 30 x 3	1

No	Peralatan
1	Gerinda potong besi
2	Kompresor
3	<i>Spray gun</i> cat

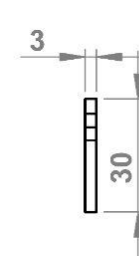
Skala 1:2
Satuan: milimeter



Tampak Atas

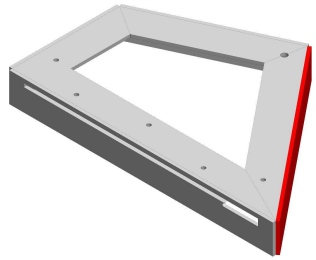


Tampak Depan

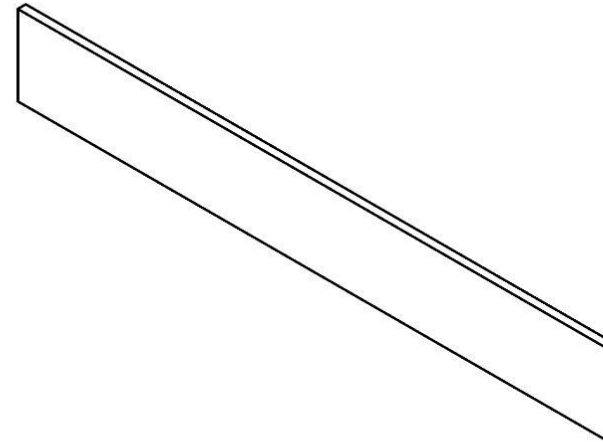


Tampak Samping

TUAS SET - N.3



No	Material	Ukuran (mm)	Jumlah
1	Plat besi 3 mm	220 x 30 x 3	1



No	Peralatan
1	Gerinda potong besi
2	Kompresor
3	Spray gun cat

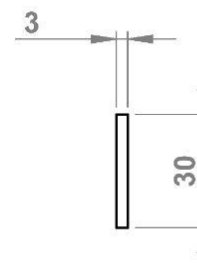
Skala 1:2
Satuan: milimeter



Tampak Atas

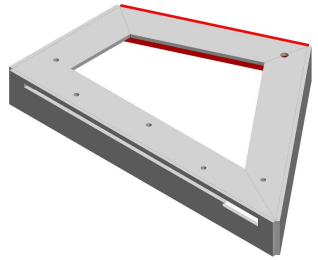


Tampak Depan



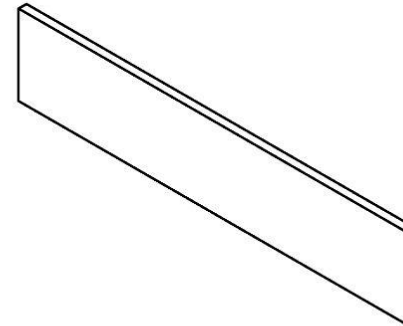
Tampak Samping

TUAS SET - N.4



No	Material	Ukuran (mm)	Jumlah
1	Plat besi 3 mm	145 x 30 x 3	1

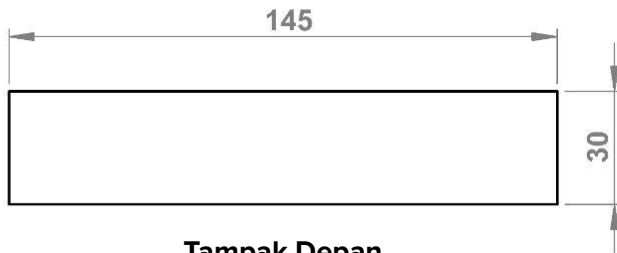
No	Peralatan
1	Gerinda potong besi
2	Kompresor
3	<i>Spray gun</i> cat



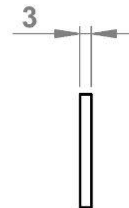
Skala 1:2
Satuan: milimeter



Tampak Atas

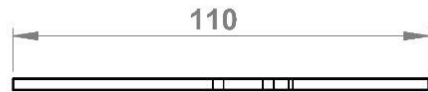
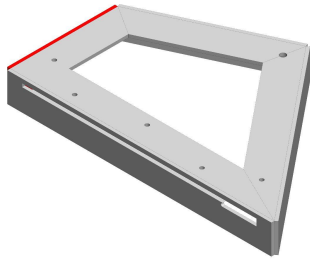


Tampak Depan

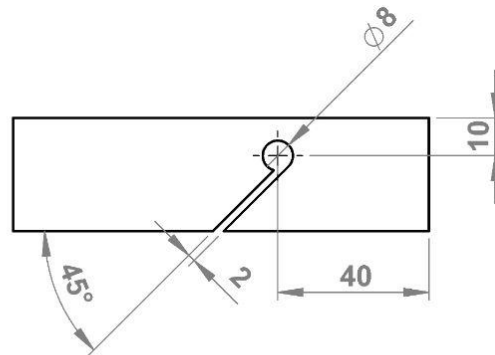


Tampak Samping

TUAS SET - N.5

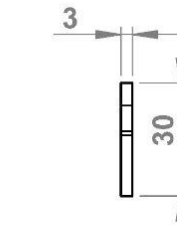
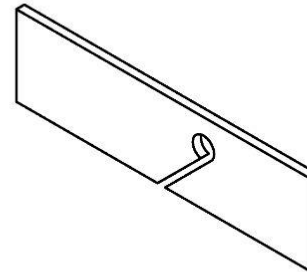


Tampak Atas



Tampak Depan

No	Material	Ukuran (mm)	Jumlah
1	Plat besi 3 mm	110 x 30 x 3	1

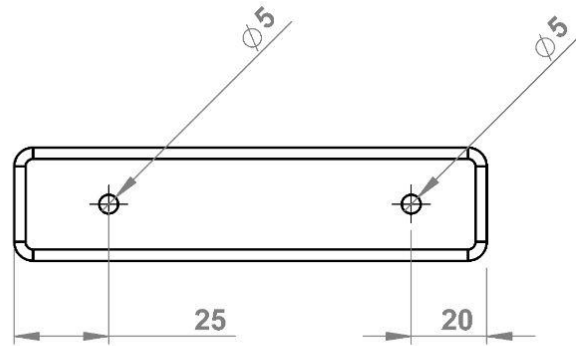
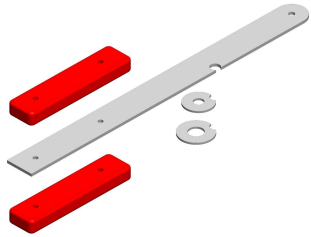


Tampak Samping

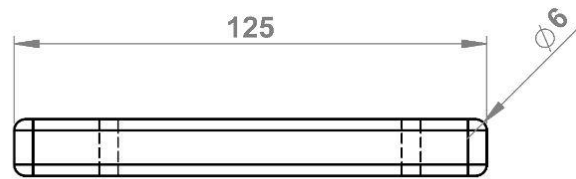
No	Peralatan
1	Gerinda potong besi
2	Kompresor
3	<i>Spray gun</i> cat

Skala 1:2
Satuan: milimeter

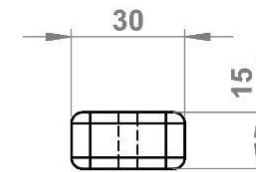
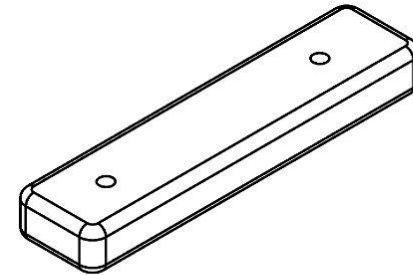
TUAS SET - N.6



Tampak Atas



Tampak Depan



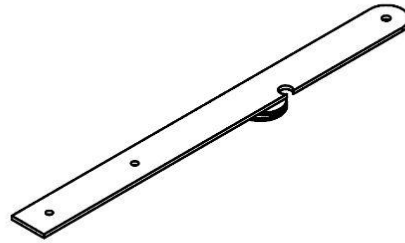
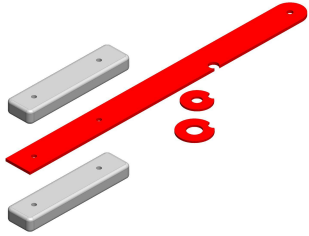
Tampak Samping

No	Peralatan
1	Gergaji kayu
2	Bor tangan

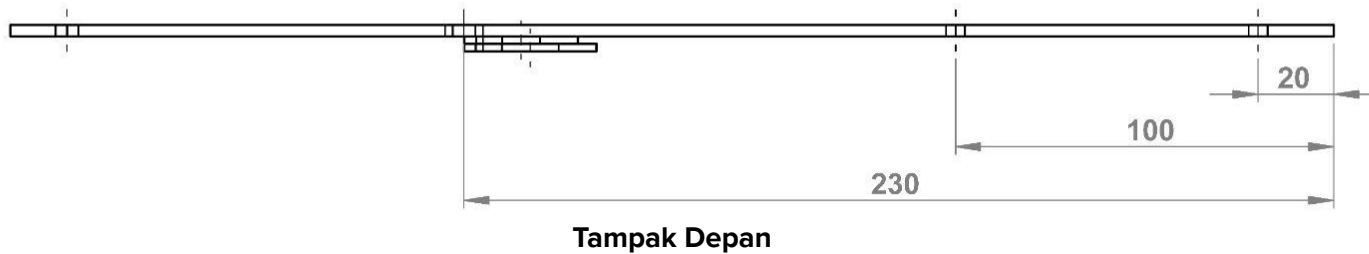
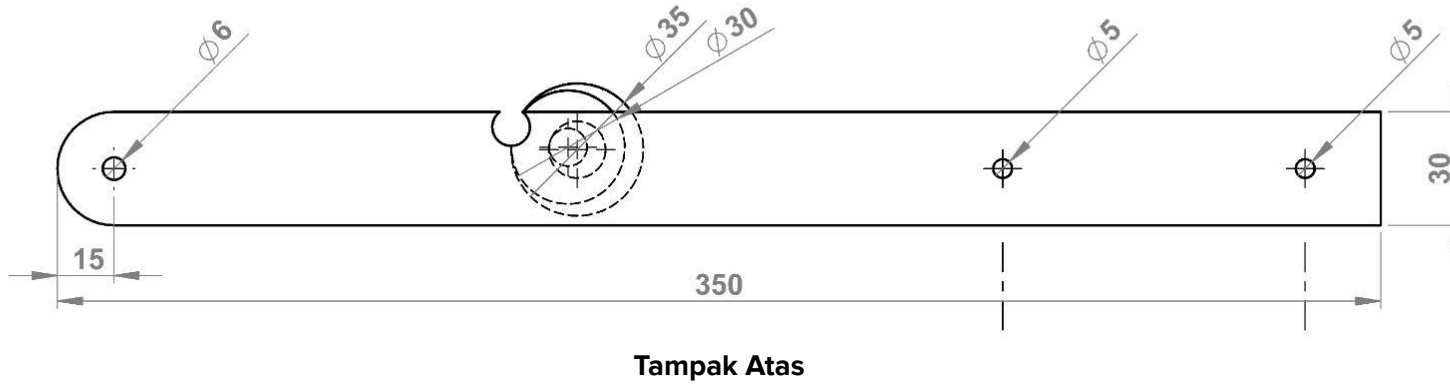
Skala 1:2
Satuan: milimeter

No	Material	Ukuran (mm)	Jumlah
1	Kayu Kelapa	125 x 30 x 15	2 buah

TUAS SET - N.7



No	Material	Ukuran (mm)	Jumlah
1	Plat besi 3 mm	350 x 30 x 3	1 buah
2	Ring 35 mm	35	1 buah
3	Ring 30 mm	30	1 buah



No	Peralatan
1	Gerinda potong besi
2	Kompresor
3	<i>Spray gun</i> cat

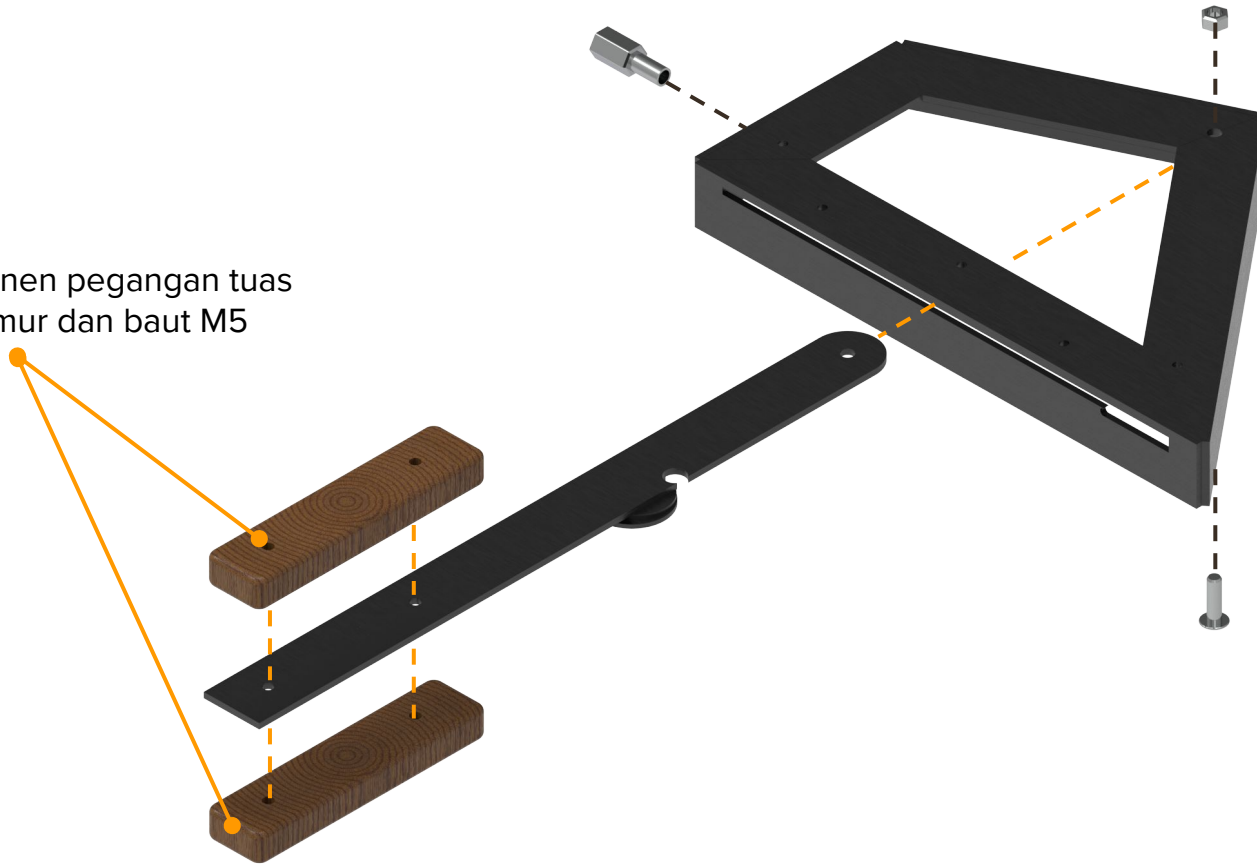
Skala 1:2
Satuan: milimeter



Tampak Samping

TUAS SET - PERAKITAN

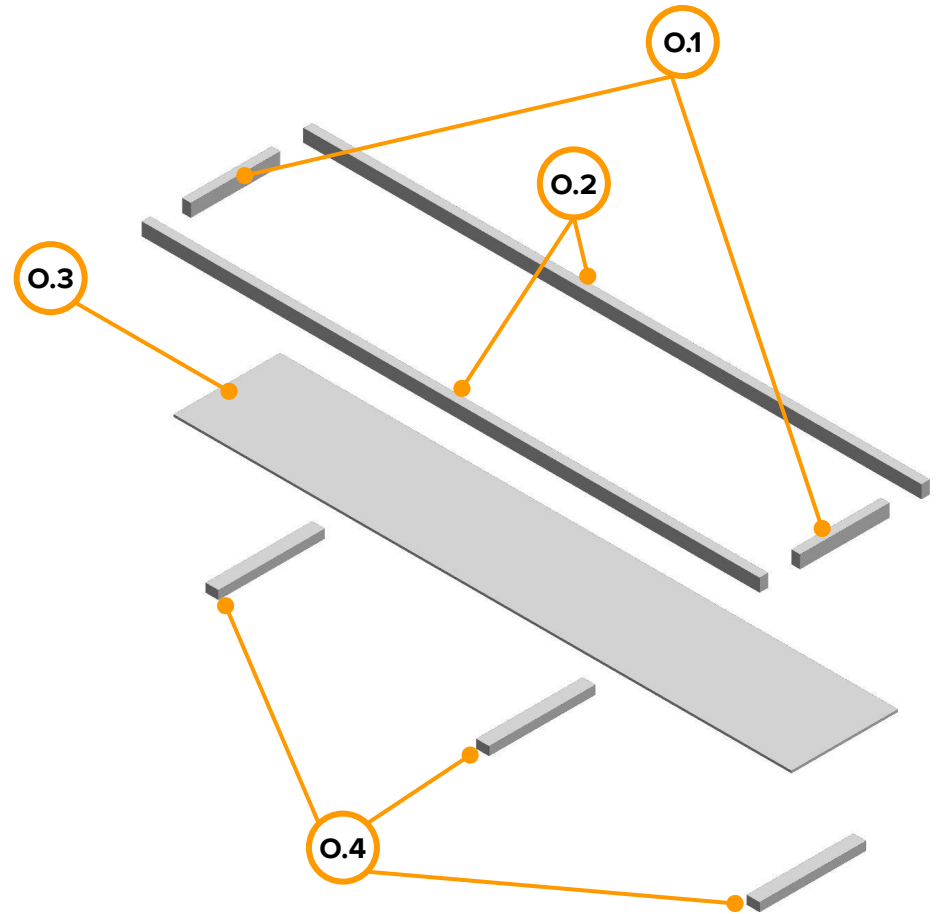
Satukan komponen pegangan tuas menggunakan mur dan baut M5



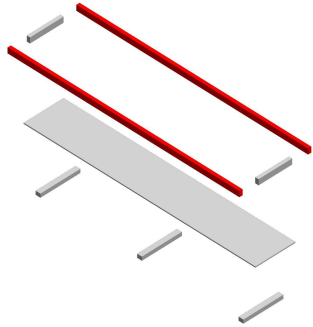
A close-up photograph of a wooden frame joint. A silver metal bracket is attached to the top of a wooden beam. Below it, a black pulley system is visible, consisting of a black plastic pulley block and a brass-colored metal pin. A thin wire or string is threaded through the pulley. The background is slightly blurred, showing more of the wooden structure and a gravel surface.

MEJA BENANG

MEJA BENANG - O



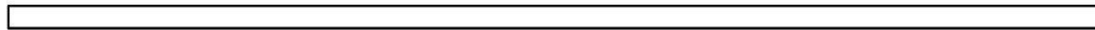
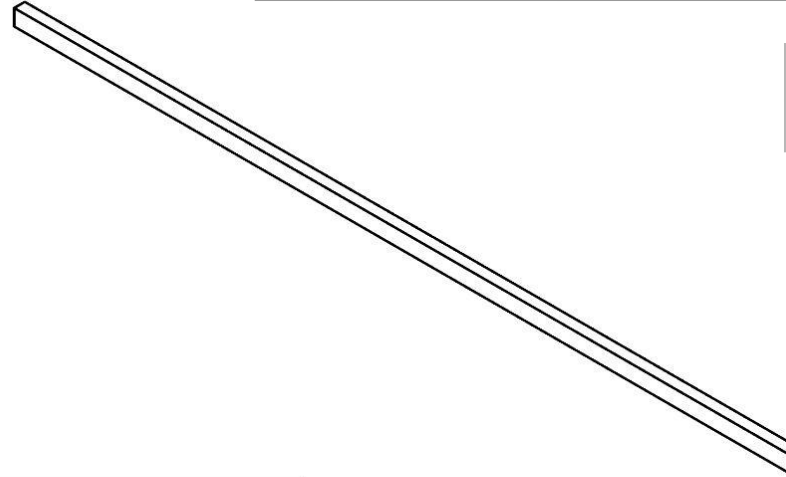
MEJA BENANG - 0.1



No	Material	Ukuran (mm)	Jumlah
1	Kayu pinus	1450 x 30 x 20	2 buah

No	Peralatan
1	Gergaji kayu

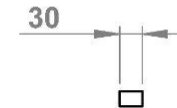
Skala 1:10
Satuan: milimeter



Tampak Atas

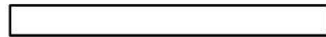
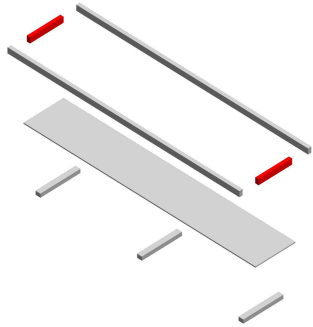


Tampak Depan



Tampak Samping

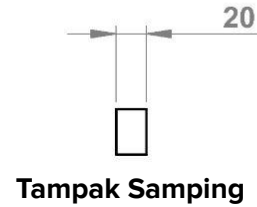
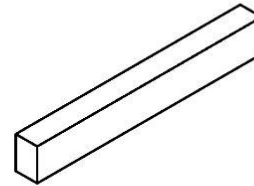
MEJA BENANG - 0.2



Tampak Atas



Tampak Depan



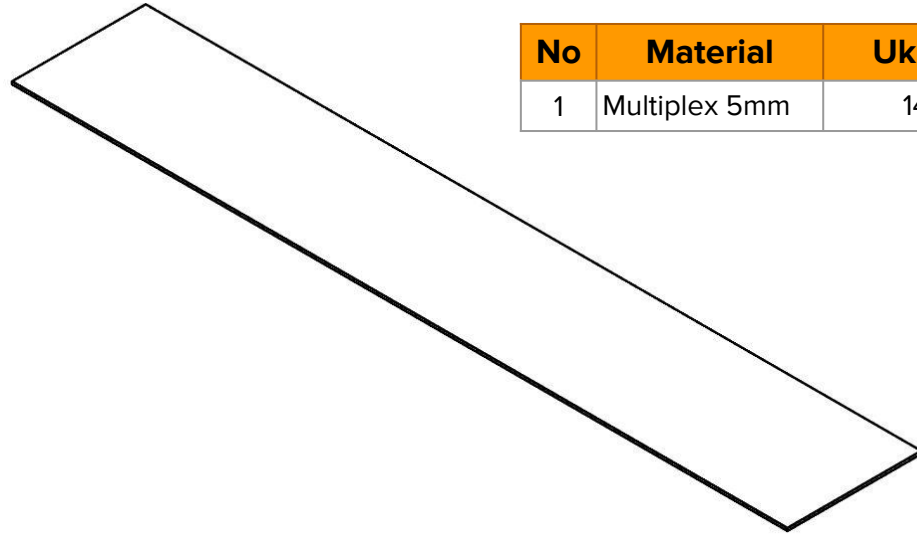
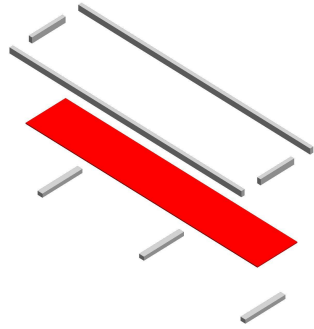
Tampak Samping

No	Material	Ukuran (mm)	Jumlah
1	Kayu pinus	210 x 30 x 20	2 buah

No	Peralatan
1	Gergaji kayu

Skala 1:5
Satuan: milimeter

MEJA BENANG - O.3



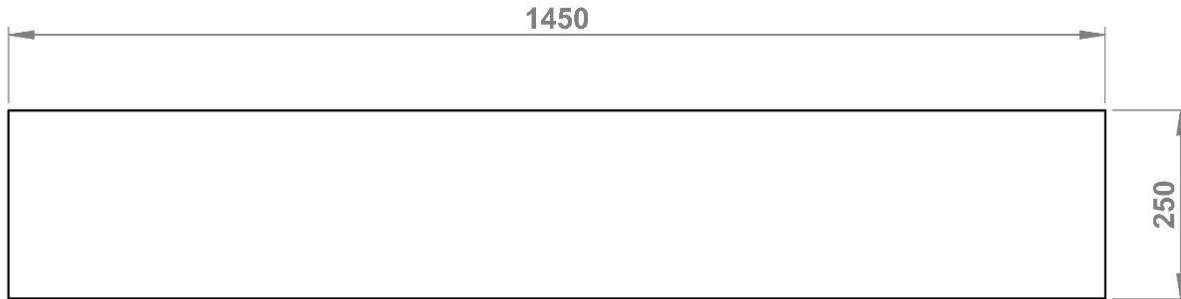
No	Material	Ukuran (mm)	Jumlah
1	Multiplex 5mm	1450 x 250	1 buah

No	Peralatan
1	Gergaji Kayu

Skala 1:10
Satuan: milimeter



Tampak Atas

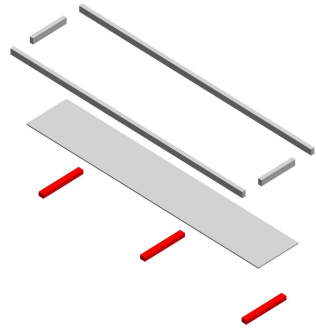


Tampak Depan



Tampak Samping

MEJA BENANG - O.4



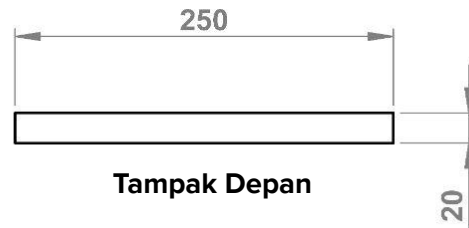
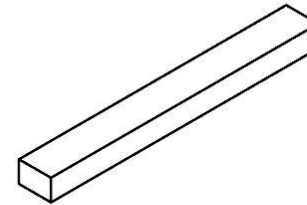
No	Material	Ukuran (mm)	Jumlah
1	Kayu pinus	250 x 30 x 20	3 buah

No	Peralatan
1	Gergaji kayu

Skala 1:5
Satuan: milimeter



Tampak Atas

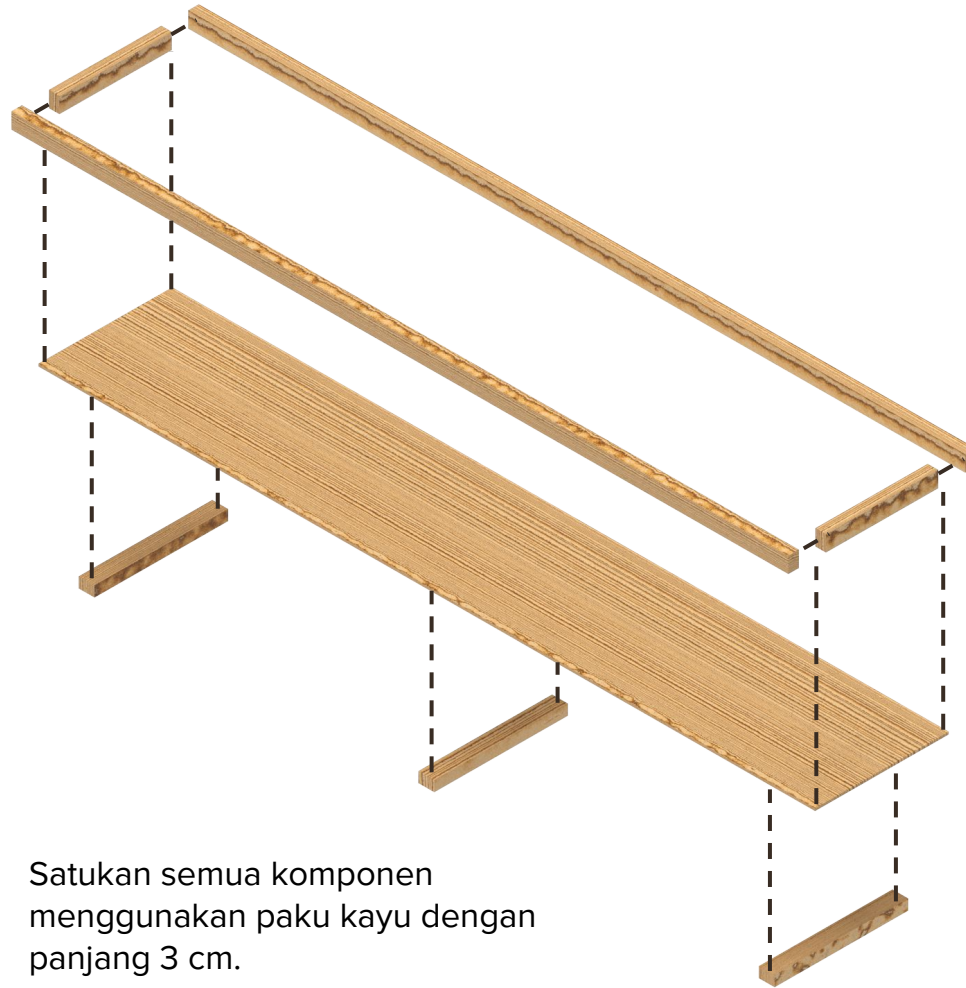


Tampak Depan



Tampak Samping

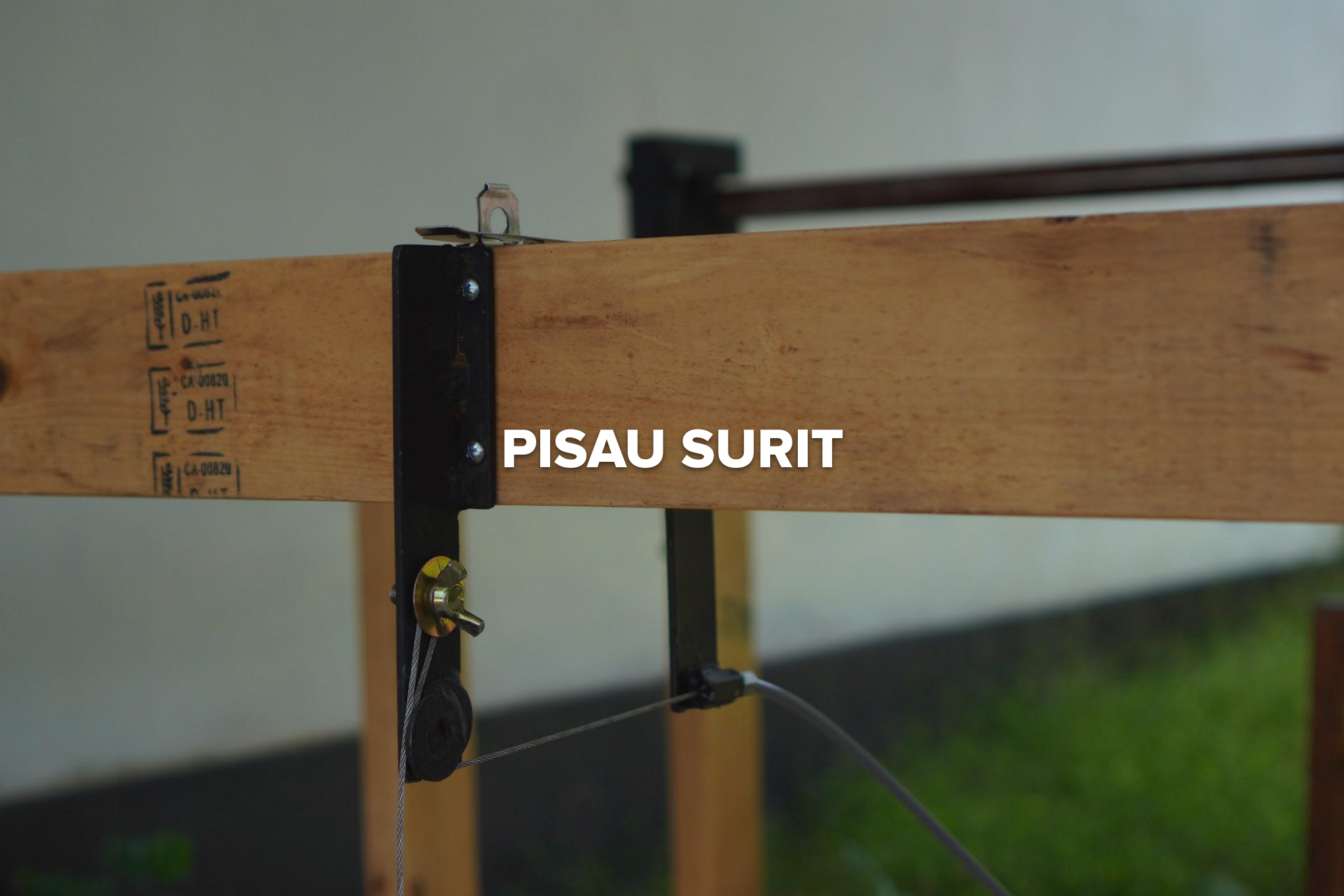
MEJA BENANG - PERAKITAN



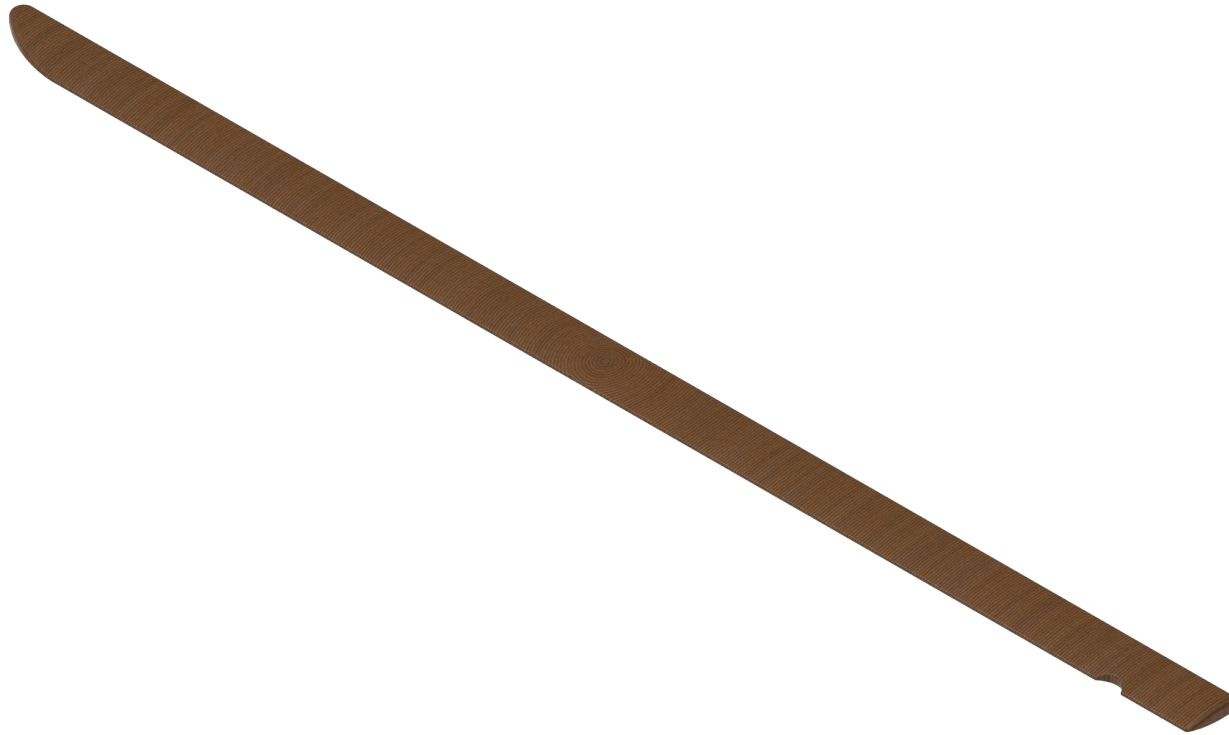
Satukan semua komponen menggunakan paku kayu dengan panjang 3 cm.

PISAU SURIT

CA-00820
D-HT
CA-00820
D-HT
CA-00820
D-HT



PISAU SURIT - P

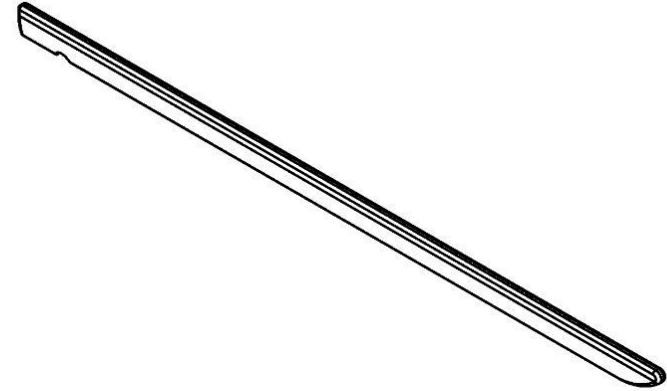


PISAU SURIT - P

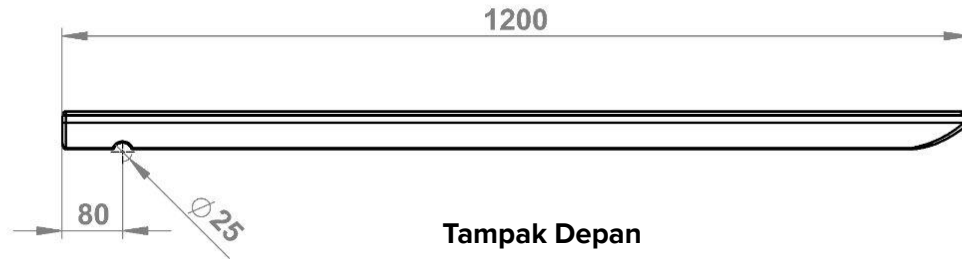
No	Material	Ukuran (mm)	Jumlah
1	Kayu Kelapa	1200 x 50 x 15	2 buah

No	Peralatan
1	Gergaji
2	Alat pahat kayu
3	Palu

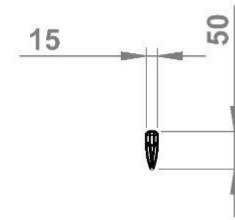
Skala 1:10
Satuan: milimeter



Tampak Atas



Tampak Depan



Tampak Samping

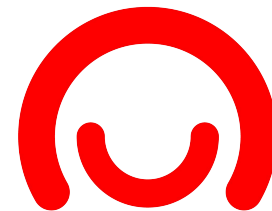
Proyek ini merupakan kolaborasi dari:



Didukung oleh:



TORAJAMELO



Polish aid

**Alamat Jl. Raya Mas, Br. Abianseka, Desa Mas, Kecamatan Ubud,
Gianyar, Bali, 80571, Indonesia
Nomer Telpon +62 361 9082486
Website <http://kopernik.info>
Facebook [facebook.com/thekopenik](https://www.facebook.com/thekopenik)
Twitter [@theKopernik](https://twitter.com/theKopernik)
Instagram [@kopernik.info](https://www.instagram.com/kopernik.info)**