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Pustaka.

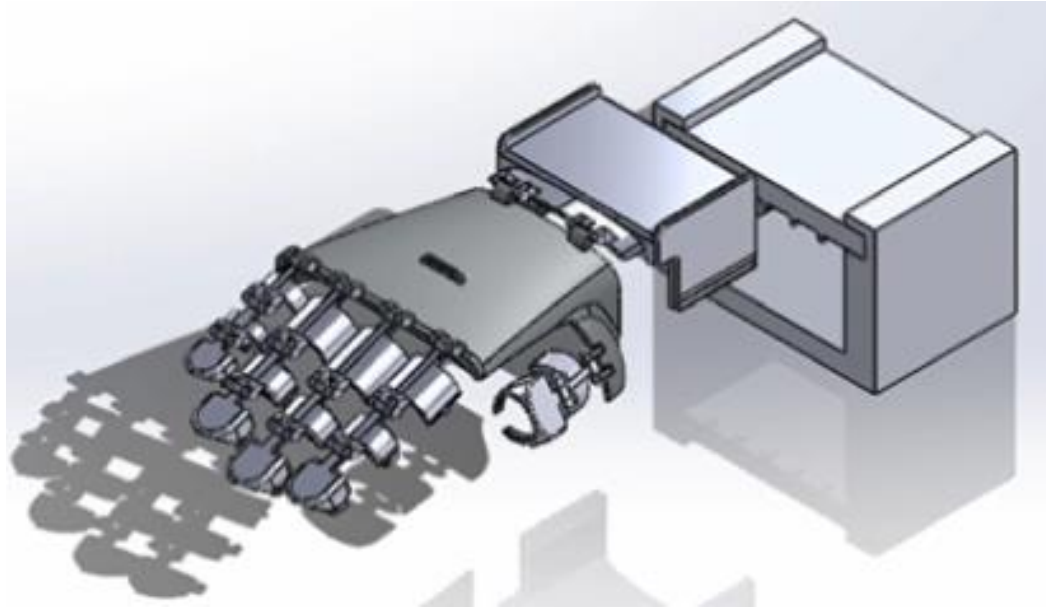
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LAMPIRAN

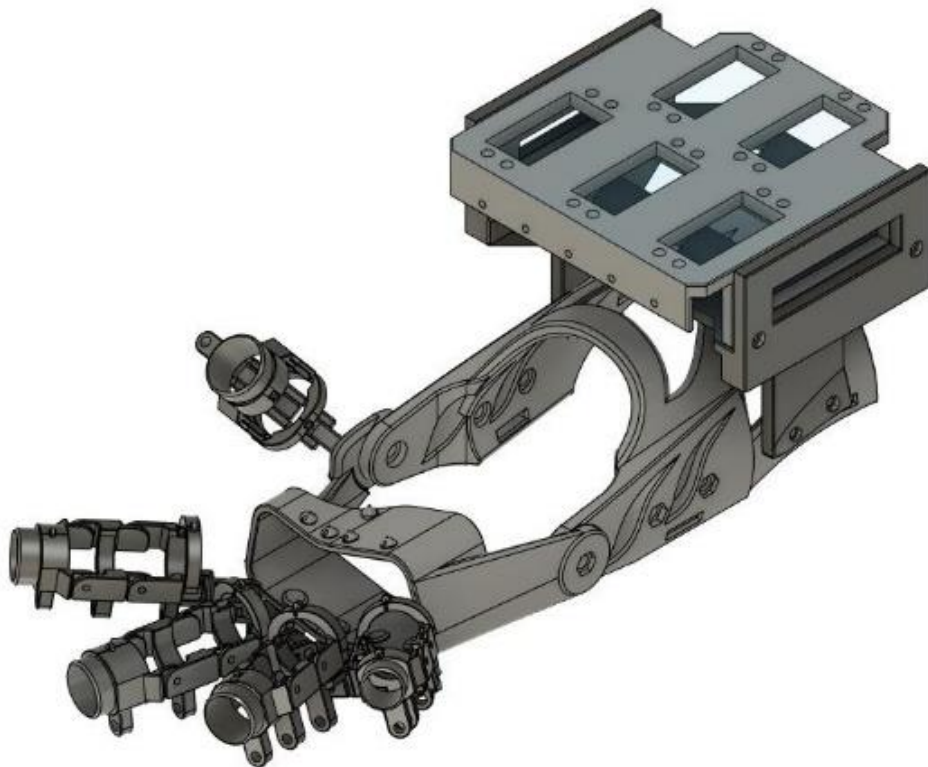
Lampiran 1 Jadwal Penelitian

No.	Kegiatan	2023/2024												
		1	2	3	4	5	6	7	8	9	10	11	12	
1	Studi Literature													
2	Desain Hand Exoskeleton													
3	Perencanaan Mekanisme Gerakan													
4	Simulasi Mekanisme Gerakan													
5	Validasi Hasil Simulasi													
6	Penyusunan Laporan													
7	Seminar Pengujian Proposal													
8	Prosiding													
9	Print 3D Exoskeleton													
10	Assembly Part dan Sistem Kontrol													
11	Pengujian Mekanisme Gerakan													
12	Validasi Hasil Eksperimental													
13	Analisa data													
14	Penyusunan Laporan													
15	Seminar Hasil													
16	Jurnal													
17	Seminar Tutup													

Lampiran 2 Desain Pertama *Exoskeleton*



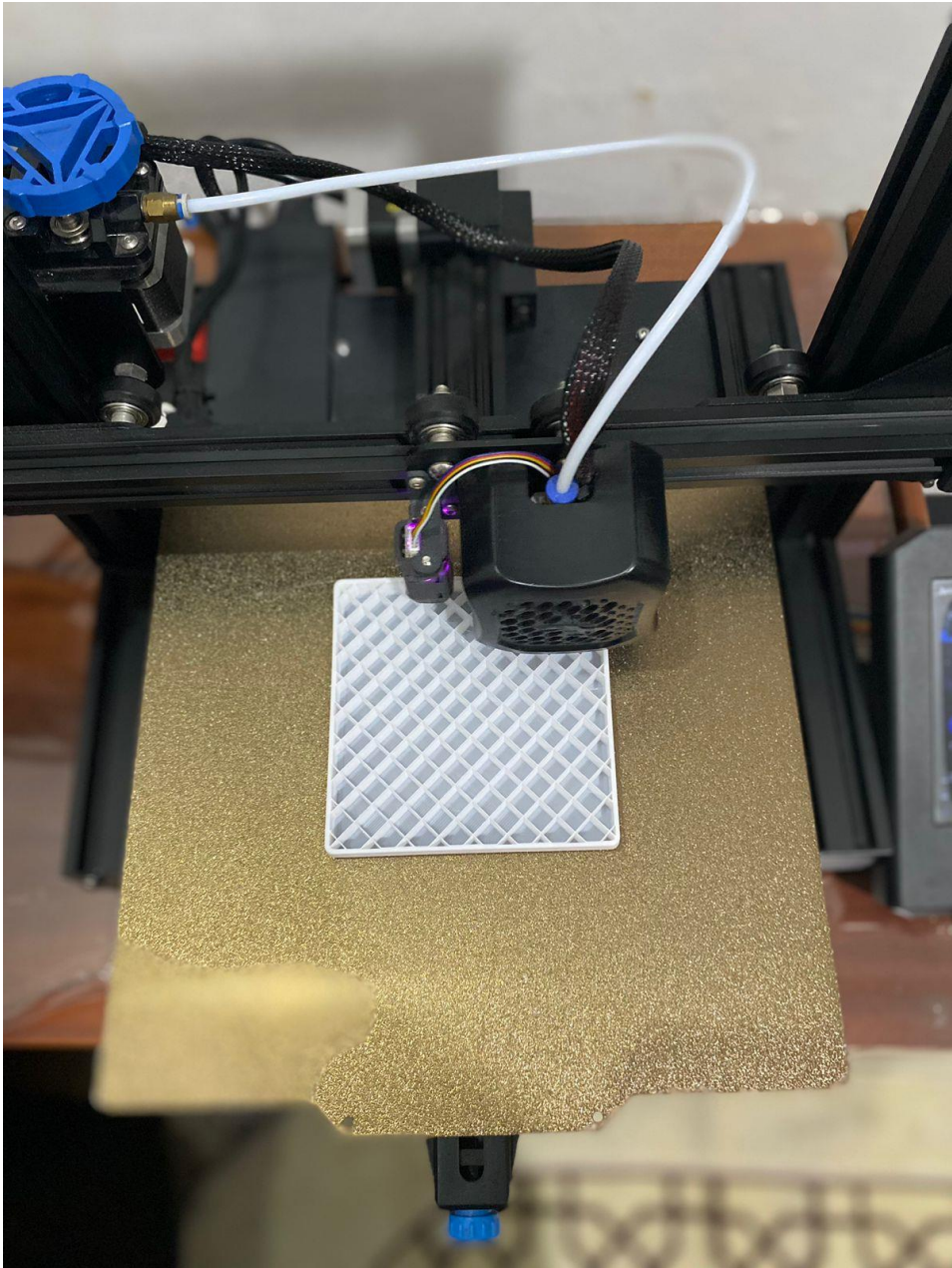
Lampiran 3 Desain Kedua *Exoskeleton*



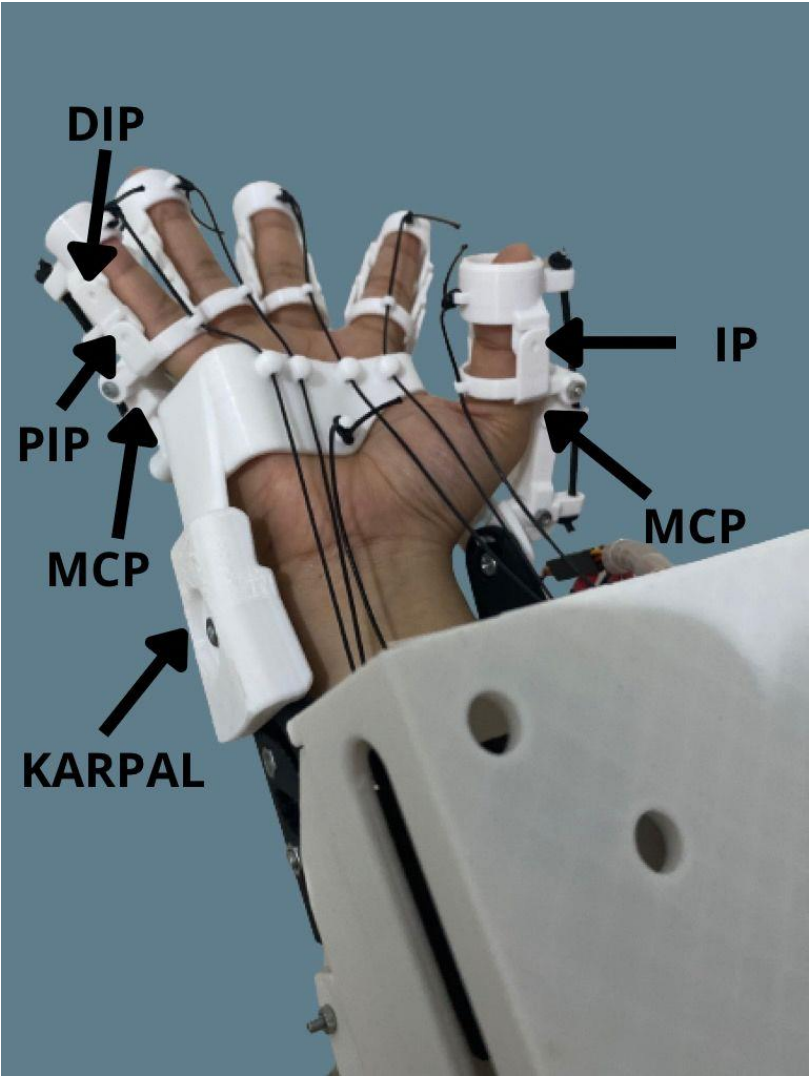
Lampiran 4 Proses Cetak Lengan Servo *Exoskeleton*



Lampiran 5 Proses Cetak Penutup Servo



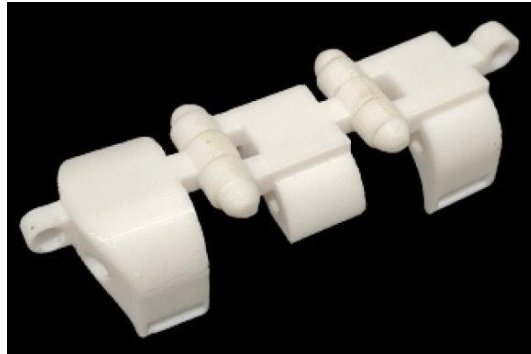
Lampiran 6 Hasil Cetak *Exoskeleton*



Lampiran 7 Cetak 2 Cincin Jari *Exoskeleton*



Lampiran 8 Cetak 3 Cincin Jari *Exoskeleton*



Lampiran 9 Lengan Servo Bulat



Lampiran 10 Alur Tali Desain Pertama



Lampiran 11 Alur Tali Desain Kedua



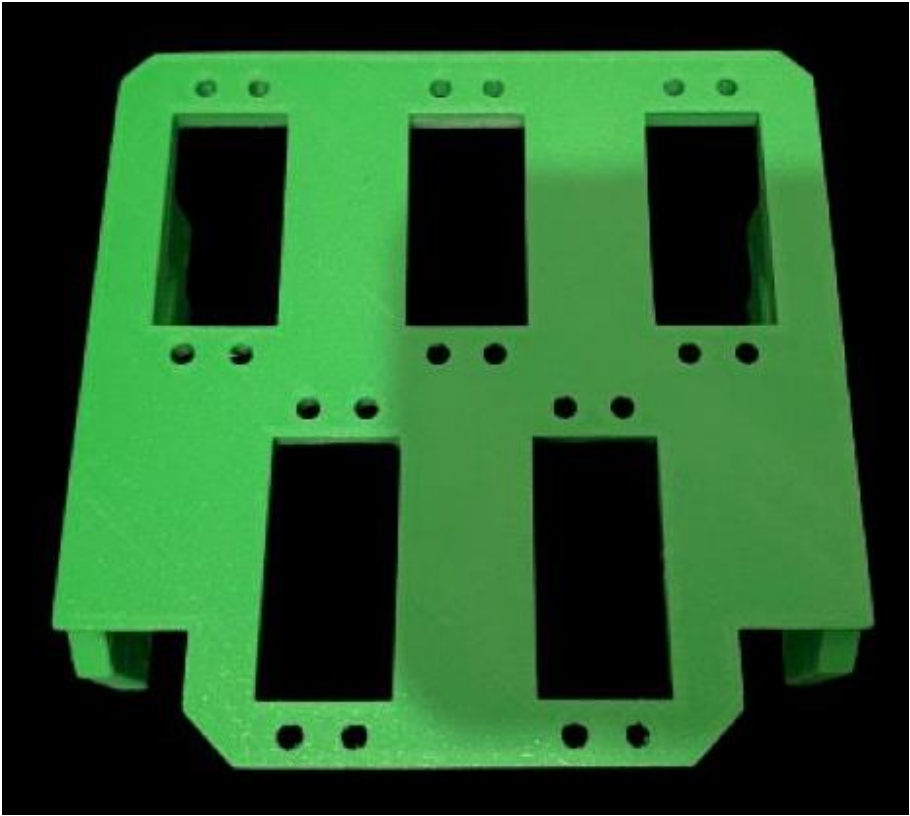
Lampiran 12 Alur Tali Desain Ketiga



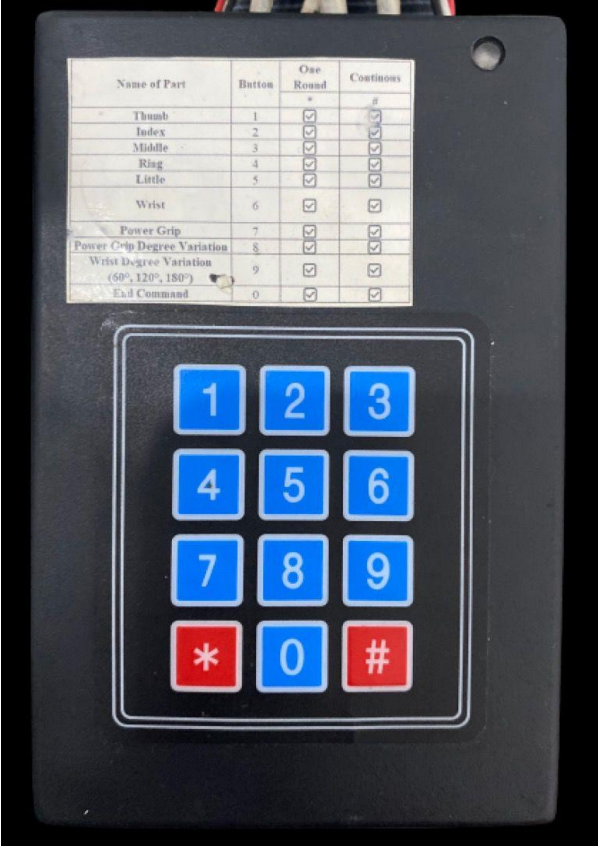
Lampiran 13 *Bracket Servo* Desain Pertama



Lampiran 14 *Bracket Servo* Desain Kedua



Lampiran 15 *Box* Kontrol



Lampiran 16 Program Mekanisme Gerak

```
REHAB_TANGAN_SERVO_180
#include <Servo.h>
#include <Keypad.h>

Servo servo1;
Servo servo2;
Servo servo3;
Servo servo4;
Servo servo5;
Servo servo6;

const byte ROWS = 4;
const byte COLS = 3;

char hexaKeys[ROWS][COLS] = {
  {'1', '2', '3'},
  {'4', '5', '6'},
  {'7', '8', '9'},
  {'*', '0', '#'}
};

byte rowPins[ROWS] = {33, 35, 37, 39};
byte colPins[COLS] = {41, 43, 45};

Keypad customKeypad = Keypad(makeKeymap(hexaKeys), rowPins, colPins, ROWS, COLS);

int order1;int mode=0;

#define lampR 2
#define lampG 3
#define lampB 4
```

```

int s1a=180, s1b=0, s1c=120, s1d=60;
int s2a=180, s2b=0, s2c=120, s2d=60;
int s3a=180, s3b=0, s3c=120, s3d=60;
int s4a=0, s4b=180, s4c=60, s4d=120;
int s5a=0, s5b=180, s5c=60, s5d=120;
int s6a=180, s6b=60, s6c=120, s6d=90;

int siklus1=0;int pos1=0;
int siklus2=0;
int siklus3=0;
int siklus4=0;
int siklus5=0;
int siklus6=0;
int siklus7=0;
int siklus8=0;
int siklus9=0;

const long duration1=1200, duration2=1400, duration3=1000;
long reTime1=0;

void lampuRGB(int val){
  if(val==0){digitalWrite(lampR, 0);digitalWrite(lampG, 0);digitalWrite(lampB, 0);}
  if(val==1){digitalWrite(lampR, 1);digitalWrite(lampG, 0);digitalWrite(lampB, 0);}
  if(val==2){digitalWrite(lampR, 0);digitalWrite(lampG, 1);digitalWrite(lampB, 0);}
  if(val==3){digitalWrite(lampR, 0);digitalWrite(lampG, 0);digitalWrite(lampB, 1);}
}

```

```

void setup() {
  Serial.begin(9600);
  servo1.attach(12);servo1.write(s1a);
  servo2.attach(11);servo2.write(s2a);
  servo3.attach(10);servo3.write(s3a);
  servo4.attach(9);servo4.write(s4a);
  servo5.attach(8);servo5.write(s5a);
  servo6.attach(7);servo6.write(s6a);
  order1=0;

  pinMode(lampR, OUTPUT);pinMode(lampG, OUTPUT);pinMode(lampB, OUTPUT);
}

void loop() {
  char customKey = customKeypad.getKey();

  if (customKey){
    if(customKey == '0'){order1=10;}
    if(customKey == '1'){order1=1;}
    if(customKey == '2'){order1=2;}
    if(customKey == '3'){order1=3;}
    if(customKey == '4'){order1=4;}
    if(customKey == '5'){order1=5;}
    if(customKey == '6'){order1=6;}
    if(customKey == '7'){order1=7;}
    if(customKey == '8'){order1=8;}
    if(customKey == '9'){order1=9;}

    if(customKey == '*'){mode=0;order1=0;}
    if(customKey == '#'){mode=1;order1=0;}
  }
}

```

```

if (order1==10) {
    servo1.write(s1a);servo2.write(s2a);servo3.write(s3a);servo4.write(s4a);servo5.write(s5a);servo6.write(s6a);
    siklus1=2;siklus2=2;siklus3=2;siklus4=2;siklus5=2;siklus6=2;siklus7=2;siklus8=6;siklus9=6;
}

if (mode==0) {
    lampuRGB(2);

    if (order1==1) {siklus2=0;siklus3=0;siklus4=0;siklus5=0;siklus6=0;siklus7=0;siklus8=0;siklus9=0;
        servo2.write(s2a);servo3.write(s3a);servo4.write(s4a);servo5.write(s5a);
        if (siklus1==2) {siklus1=0;}
        if (siklus1==0) {if ((millis()- reTime1)>= duration1) {
            servo1.write(s1b);siklus1=1;reTime1=millis();
        }}
        if (siklus1==1) {if ((millis()- reTime1)>= duration1) {
            servo1.write(s1a);reTime1=millis();
        }}
    }

    if (order1==2) {siklus1=0;siklus3=0;siklus4=0;siklus5=0;siklus6=0;siklus7=0;siklus8=0;siklus9=0;
        servo1.write(s1a);servo3.write(s3a);servo4.write(s4a);servo5.write(s5a);
        if (siklus2==2) {siklus2=0;}
        if (siklus2==0) {if ((millis()- reTime1)>= duration2) {
            servo2.write(s2b);siklus2=1;reTime1=millis();
        }}
        if (siklus2==1) {if ((millis()- reTime1)>= duration1) {
            servo2.write(s2a);reTime1=millis();
        }}
    }

    if (order1==3) {siklus1=0;siklus2=0;siklus4=0;siklus5=0;siklus6=0;siklus7=0;siklus8=0;siklus9=0;
        servo1.write(s1a);servo2.write(s2a);servo4.write(s4a);servo5.write(s5a);
        if (siklus3==2) {siklus3=0;}
        if (siklus3==0) {if ((millis()- reTime1)>= duration2) {
            servo3.write(s3b);siklus3=1;reTime1=millis();
        }}
        if (siklus3==1) {if ((millis()- reTime1)>= duration1) {
            servo3.write(s3a);reTime1=millis();
        }}
    }

    if (order1==4) {siklus1=0;siklus2=0;siklus3=0;siklus5=0;siklus6=0;siklus7=0;siklus8=0;siklus9=0;
        servo1.write(s1a);servo2.write(s2a);servo3.write(s3a);servo5.write(s5a);
        if (siklus4==2) {siklus4=0;}
        if (siklus4==0) {if ((millis()- reTime1)>= duration2) {
            servo4.write(s4b);siklus4=1;reTime1=millis();
        }}
        if (siklus4==1) {if ((millis()- reTime1)>= duration1) {
            servo4.write(s4a);reTime1=millis();
        }}
    }

    if (order1==5) {siklus1=0;siklus2=0;siklus3=0;siklus4=0;siklus6=0;siklus7=0;siklus8=0;siklus9=0;
        servo1.write(s1a);servo2.write(s2a);servo3.write(s3a);servo4.write(s4a);
        if (siklus5==2) {siklus5=0;}
        if (siklus5==0) {if ((millis()- reTime1)>= duration2) {
            servo5.write(s5b);siklus5=1;reTime1=millis();
        }}
        if (siklus5==1) {if ((millis()- reTime1)>= duration1) {
            servo5.write(s5a);reTime1=millis();
        }}
    }
}

```



```

if(order1==6) {siklus1=0;siklus2=0;siklus3=0;siklus4=0;siklus5=0;siklus7=0;siklus8=0;siklus9=0;
if(siklus6==2) {siklus6=0;}
if(siklus6==0) {if((millis()- reTime1)>= duration2) {
servo6.write(s6b);siklus6=1;reTime1=millis();
}}
if(siklus6==1) {if((millis()- reTime1)>= duration1) {
servo6.write(s6a);reTime1=millis();
}}
}

if(order1==7) {siklus1=0;siklus2=0;siklus3=0;siklus4=0;siklus5=0;siklus6=0;siklus8=0;siklus9=0;
if(siklus7==2) {siklus7=0;}
if(siklus7==0) {if((millis()- reTime1)>= duration2) {
servo1.write(s1b);servo2.write(s2b);servo3.write(s3b);servo4.write(s4b);servo5.write(s5b);siklus7=1;reTime1=millis();
}}
if(siklus7==1) {if((millis()- reTime1)>= duration1) {
servo1.write(s1a);servo2.write(s2a);servo3.write(s3a);servo4.write(s4a);servo5.write(s5a);reTime1=millis();
}}
}

if(order1==8) {siklus1=0;siklus2=0;siklus3=0;siklus4=0;siklus5=0;siklus6=0;siklus7=0;siklus9=0;
if(siklus8==6) {siklus8=0;}
if(siklus8==0) {if((millis()- reTime1)>= duration1) {
servo1.write(s1c);servo2.write(s2c);servo3.write(s3c);servo4.write(s4c);servo5.write(s5c);siklus8=1;reTime1=millis();
}}
if(siklus8==1) {if((millis()- reTime1)>= duration1) {
servo1.write(s1d);servo2.write(s2d);servo3.write(s3d);servo4.write(s4d);servo5.write(s5d);siklus8=2;reTime1=millis();
}}
if(siklus8==2) {if((millis()- reTime1)>= duration1) {
servo1.write(s1b);servo2.write(s2b);servo3.write(s3b);servo4.write(s4b);servo5.write(s5b);siklus8=3;reTime1=millis();
}}
if(siklus8==3) {if((millis()- reTime1)>= duration1) {
servo1.write(s1d);servo2.write(s2d);servo3.write(s3d);servo4.write(s4d);servo5.write(s5d);siklus8=4;reTime1=millis();
}}
if(siklus8==4) {if((millis()- reTime1)>= duration1) {
servo1.write(s1c);servo2.write(s2c);servo3.write(s3c);servo4.write(s4c);servo5.write(s5c);siklus8=5;reTime1=millis();
}}
if(siklus8==5) {if((millis()- reTime1)>= duration1) {
servo1.write(s1a);servo2.write(s2a);servo3.write(s3a);servo4.write(s4a);servo5.write(s5a);reTime1=millis();
}}
}

if(order1==9) {siklus1=0;siklus2=0;siklus3=0;siklus4=0;siklus5=0;siklus6=0;siklus7=0;siklus8=0;
if(siklus9==6) {siklus9=0;}
if(siklus9==0) {if((millis()- reTime1)>= duration1) {
servo6.write(s6c);siklus9=1;reTime1=millis();
}}
if(siklus9==1) {if((millis()- reTime1)>= duration1) {
servo6.write(s6d);siklus9=2;reTime1=millis();
}}
if(siklus9==2) {if((millis()- reTime1)>= duration1) {
servo6.write(s6b);siklus9=3;reTime1=millis();
}}
}

```

```

        if(siklus9==3){if((millis()- reTime1)>= duration1){
            servo6.write(s6d);siklus9=4;reTime1=millis();
        }
    }
    if(siklus9==4){if((millis()- reTime1)>= duration1){
        servo6.write(s6c);siklus9=5;reTime1=millis();
    }
    }
    if(siklus9==5){if((millis()- reTime1)>= duration1){
        servo6.write(s6a);reTime1=millis();
    }
    }
}

}

if(mode==1){
    lampuRGB(3);

    if(order1==1){siklus2=0;siklus3=0;siklus4=0;siklus5=0;siklus6=0;siklus7=0;siklus8=0;siklus9=0;
        servo2.write(s2a);servo3.write(s3a);servo4.write(s4a);servo5.write(s5a);
        if(siklus1==2){siklus1=0;}
        if(siklus1==0){if((millis()- reTime1)>= duration1){
            servo1.write(s1b);siklus1=1;reTime1=millis();
        }
        }
        if(siklus1==1){if((millis()- reTime1)>= duration1){
            servo1.write(s1a);siklus1=0;reTime1=millis();
        }
        }
    }

    if(order1==2){siklus1=0;siklus3=0;siklus4=0;siklus5=0;siklus6=0;siklus7=0;siklus8=0;siklus9=0;
        servo1.write(s1a);servo3.write(s3a);servo4.write(s4a);servo5.write(s5a);
        if(siklus2==2){siklus2=0;}
        if(siklus2==0){if((millis()- reTime1)>= duration2){
            servo2.write(s2b);siklus2=1;reTime1=millis();
        }
        }
        if(siklus2==1){if((millis()- reTime1)>= duration1){
            servo2.write(s2a);siklus2=0;reTime1=millis();
        }
        }
    }

    if(order1==3){siklus1=0;siklus2=0;siklus4=0;siklus5=0;siklus6=0;siklus7=0;siklus8=0;siklus9=0;
        servo1.write(s1a);servo2.write(s2a);servo4.write(s4a);servo5.write(s5a);
        if(siklus3==2){siklus3=0;}
        if(siklus3==0){if((millis()- reTime1)>= duration2){
            servo3.write(s3b);siklus3=1;reTime1=millis();
        }
        }
        if(siklus3==1){if((millis()- reTime1)>= duration1){
            servo3.write(s3a);siklus3=0;reTime1=millis();
        }
        }
    }

    if(order1==4){siklus1=0;siklus2=0;siklus3=0;siklus5=0;siklus6=0;siklus7=0;siklus8=0;siklus9=0;
        servo1.write(s1a);servo2.write(s2a);servo3.write(s3a);servo5.write(s5a);
        if(siklus4==2){siklus4=0;}
        if(siklus4==0){if((millis()- reTime1)>= duration2){
            servo4.write(s4b);siklus4=1;reTime1=millis();
        }
        }
        if(siklus4==1){if((millis()- reTime1)>= duration1){
            servo4.write(s4a);siklus4=0;reTime1=millis();
        }
        }
    }
}
}

```

```

if(order1==5){siklus1=0;siklus2=0;siklus3=0;siklus4=0;siklus6=0;siklus7=0;siklus8=0;siklus9=0;
servo1.write(s1a);servo2.write(s2a);servo3.write(s3a);servo4.write(s4a);
if(siklus5==2){siklus5=0;}
if(siklus5==0){if((millis()- reTime1)>= duration2){
servo5.write(s5b);siklus5=1;reTime1=millis();
}}
if(siklus5==1){if((millis()- reTime1)>= duration1){
servo5.write(s5a);siklus5=0;reTime1=millis();
}}
}

if(order1==6){siklus1=0;siklus2=0;siklus3=0;siklus4=0;siklus5=0;siklus7=0;siklus8=0;siklus9=0;
if(siklus6==2){siklus6=0;}
if(siklus6==0){if((millis()- reTime1)>= duration2){
servo6.write(s6b);siklus6=1;reTime1=millis();
}}
if(siklus6==1){if((millis()- reTime1)>= duration1){
servo6.write(s6a);siklus6=0;reTime1=millis();
}}
}

if(order1==7){siklus1=0;siklus2=0;siklus3=0;siklus4=0;siklus5=0;siklus6=0;siklus8=0;siklus9=0;
if(siklus7==2){siklus7=0;}
if(siklus7==0){if((millis()- reTime1)>= duration2){
servo1.write(s1b);servo2.write(s2b);servo3.write(s3b);servo4.write(s4b);servo5.write(s5b);siklus7=1;reTime1=millis();
}}
if(siklus7==1){if((millis()- reTime1)>= duration1){
servo1.write(s1a);servo2.write(s2a);servo3.write(s3a);servo4.write(s4a);servo5.write(s5a);siklus7=0;reTime1=millis();
}}
}

if(order1==8){siklus1=0;siklus2=0;siklus3=0;siklus4=0;siklus5=0;siklus6=0;siklus7=0;siklus9=0;
if(siklus8==6){siklus8=0;}
if(siklus8==0){if((millis()- reTime1)>= duration1){
servo1.write(s1c);servo2.write(s2c);servo3.write(s3c);servo4.write(s4c);servo5.write(s5c);siklus8=1;reTime1=millis();
}}
if(siklus8==1){if((millis()- reTime1)>= duration1){
servo1.write(s1d);servo2.write(s2d);servo3.write(s3d);servo4.write(s4d);servo5.write(s5d);siklus8=2;reTime1=millis();
}}
if(siklus8==2){if((millis()- reTime1)>= duration1){
servo1.write(s1b);servo2.write(s2b);servo3.write(s3b);servo4.write(s4b);servo5.write(s5b);siklus8=3;reTime1=millis();
}}
if(siklus8==3){if((millis()- reTime1)>= duration1){
servo1.write(s1d);servo2.write(s2d);servo3.write(s3d);servo4.write(s4d);servo5.write(s5d);siklus8=4;reTime1=millis();
}}
if(siklus8==4){if((millis()- reTime1)>= duration1){
servo1.write(s1c);servo2.write(s2c);servo3.write(s3c);servo4.write(s4c);servo5.write(s5c);siklus8=5;reTime1=millis();
}}
if(siklus8==5){if((millis()- reTime1)>= duration1){
servo1.write(s1a);servo2.write(s2a);servo3.write(s3a);servo4.write(s4a);servo5.write(s5a);siklus8=0;reTime1=millis();
}}
}
}

```

```

if(order1==9) {siklus1=0;siklus2=0;siklus3=0;siklus4=0;siklus5=0;siklus6=0;siklus7=0;siklus8=0;
  if(siklus9==6) {siklus9=0;}
  if(siklus9==0) {if((millis()- reTime1)>= duration1){
    servo6.write(s6c);siklus9=1;reTime1=millis();
  }}
  if(siklus9==1) {if((millis()- reTime1)>= duration1){
    servo6.write(s6d);siklus9=2;reTime1=millis();
  }}
  if(siklus9==2) {if((millis()- reTime1)>= duration1){
    servo6.write(s6b);siklus9=3;reTime1=millis();
  }}
  if(siklus9==3) {if((millis()- reTime1)>= duration1){
    servo6.write(s6d);siklus9=4;reTime1=millis();
  }}
  if(siklus9==4) {if((millis()- reTime1)>= duration1){
    servo6.write(s6c);siklus9=5;reTime1=millis();
  }}
  if(siklus9==5) {if((millis()- reTime1)>= duration1){
    servo6.write(s6a);siklus9=0;reTime1=millis();
  }}
}
}

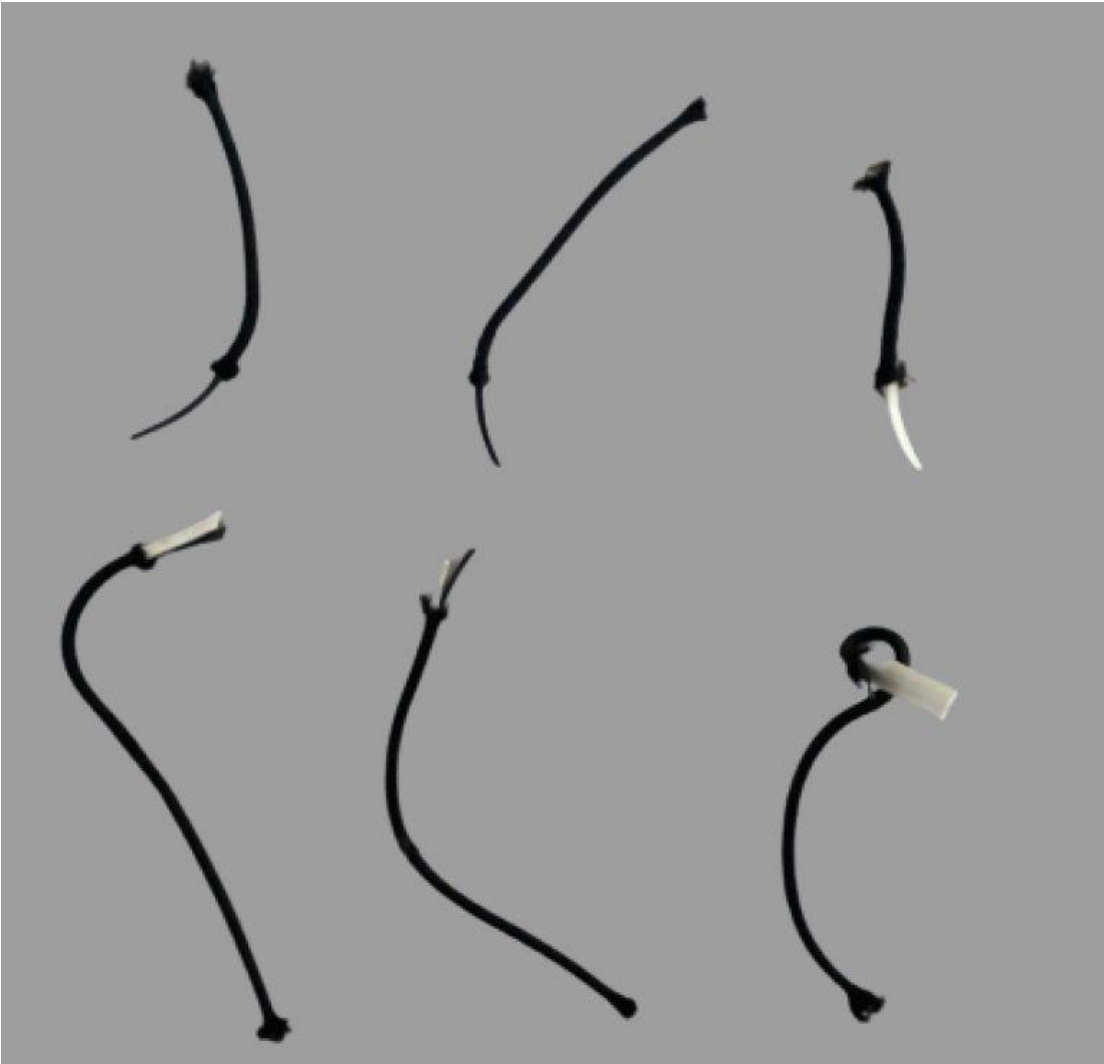
Serial.println(mode);

```

Lampiran 17 Proses Uji Tarik Tali *Push Pull*



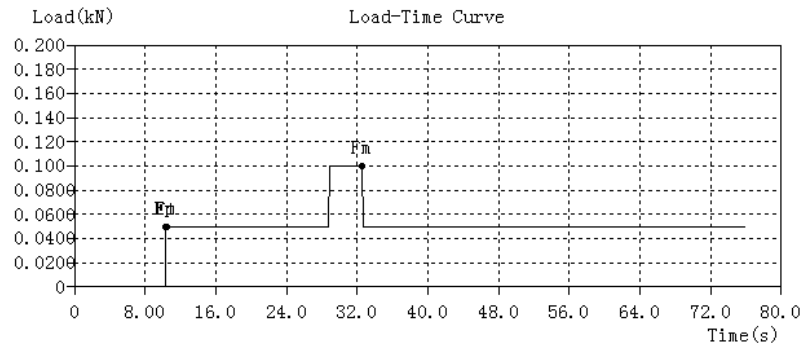
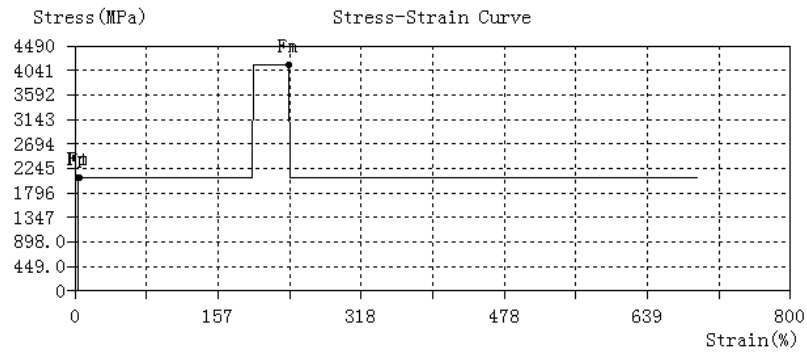
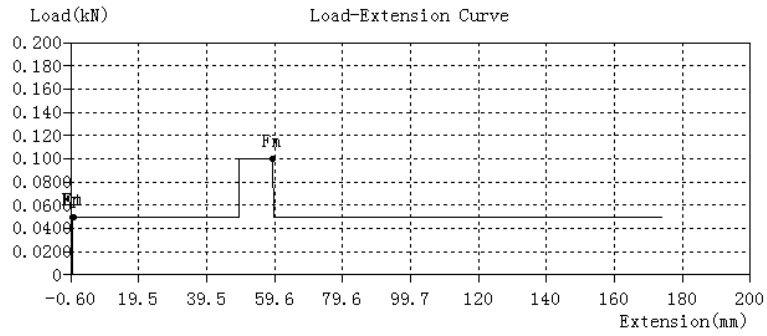
Lampiran 18 Tali *Push Pull* Uji Tarik

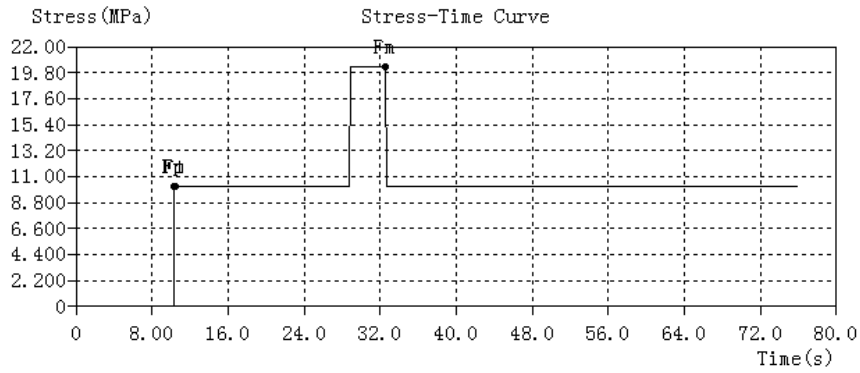
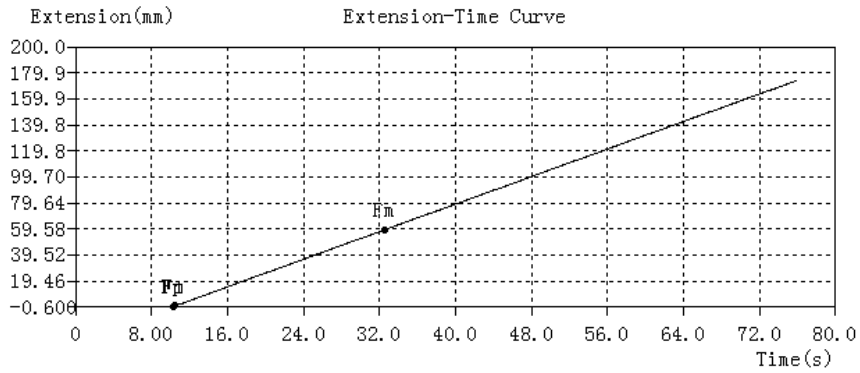
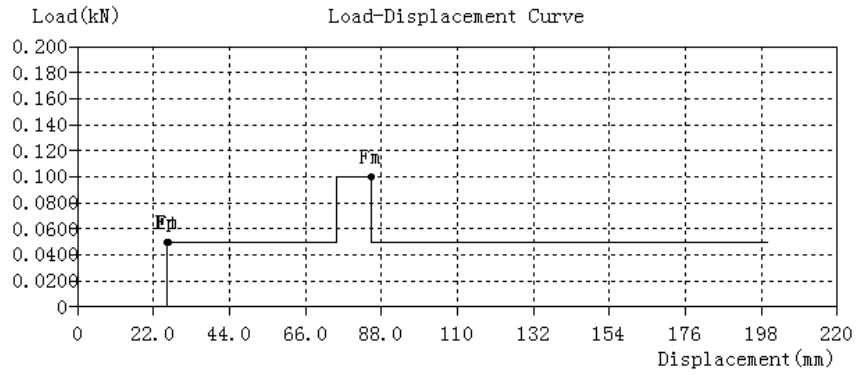


Lampiran 19 Tabel Uji Tarik Tali *Push Pull* 1

tali pushpull 1

SampleID	tali pushpull 1	TestDate	30/5/2024
Operator		Type	Circle
Size(mm)	2.5	Ao(mm ²)	4.91
Lo(mm)	20	Lu(mm)	
A(%)	/	Au(mm ²)	
Z(%)	/	Fm(kN)	/
Rm(MPa)	/	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	/
Rp(MPa)	/	Ft(kN)	/
Rt(MPa)	/	E(GPa)	/

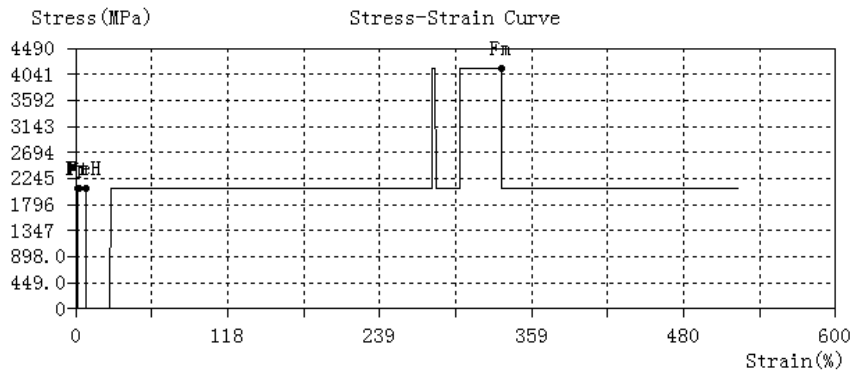
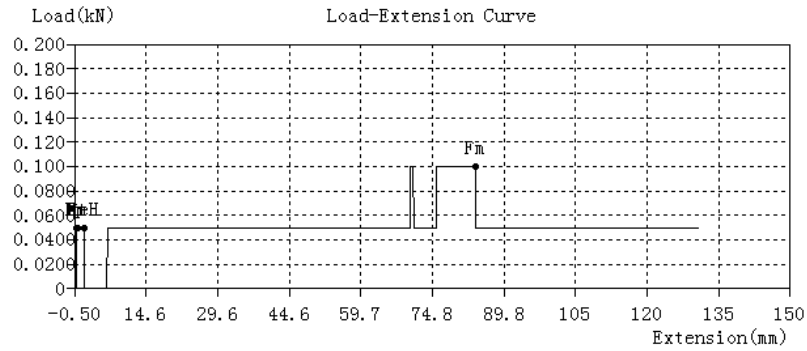


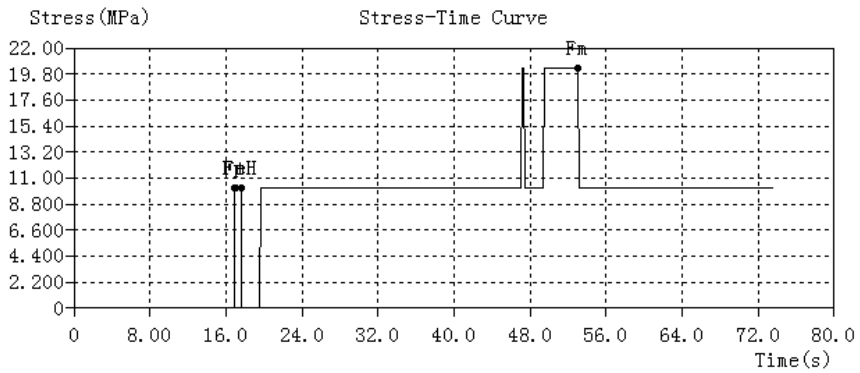
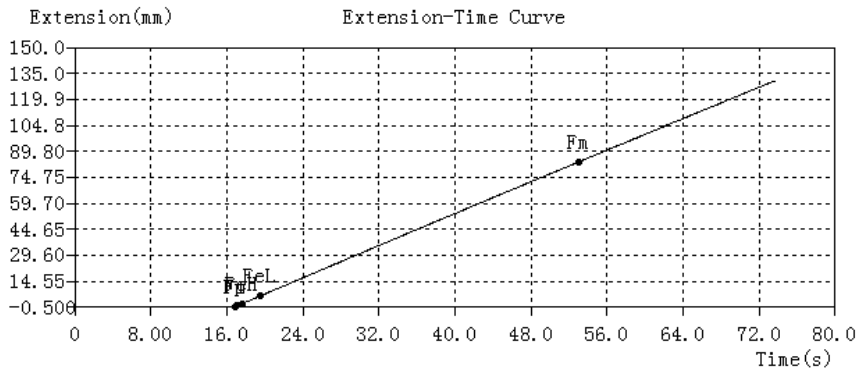
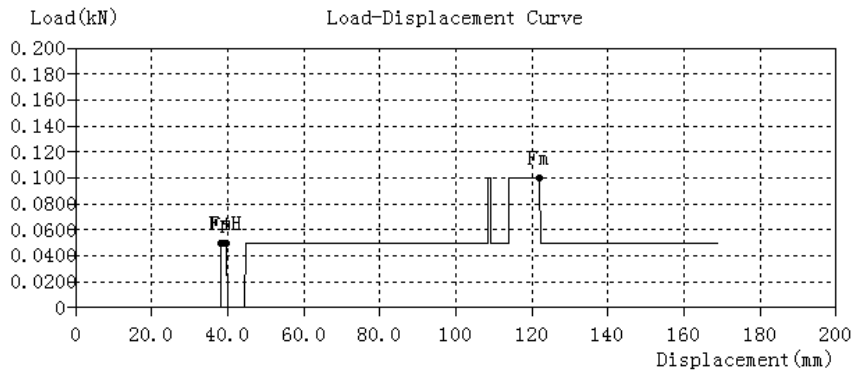
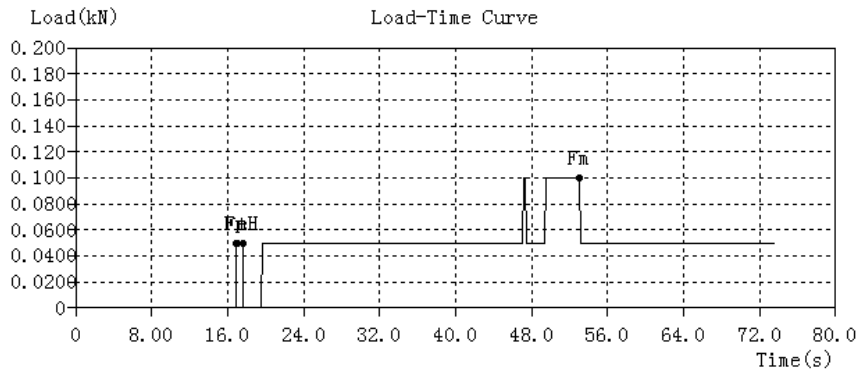


Lampiran 20 Tabel Uji Tarik Tali Push Pull 2

tali pushpull 2

SampleID	tali pushpull 2	TestDate	30/5/2024
Operator		Type	Circle
Size(mm)	2.5	Ao(mm ²)	4.91
Lo(mm)	20	Lu(mm)	
A(%)	/	Au(mm ²)	
Z(%)	/	Fm(kN)	/
Rm(MPa)	/	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	/
Rp(MPa)	/	Ft(kN)	/
Rt(MPa)	/	E(GPa)	/

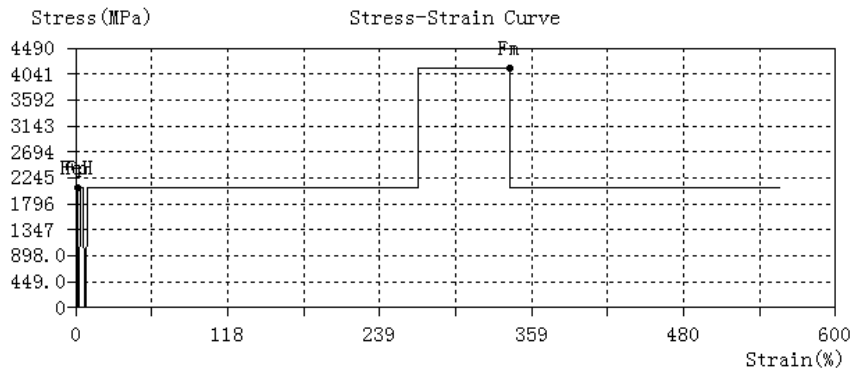
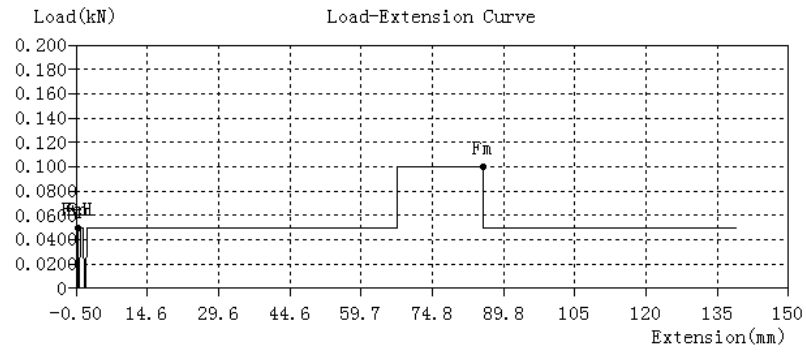


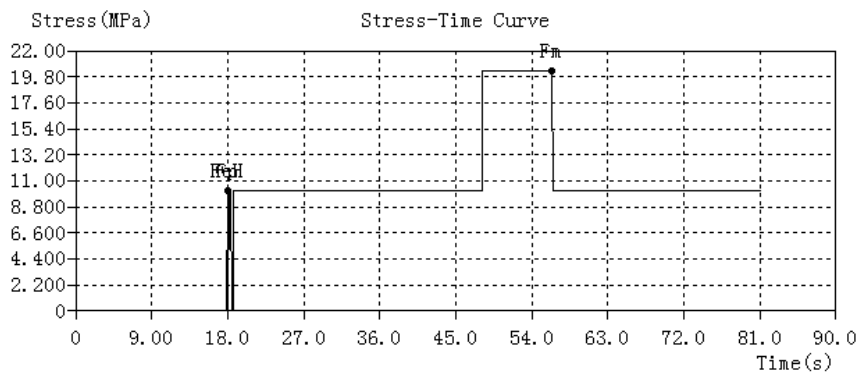
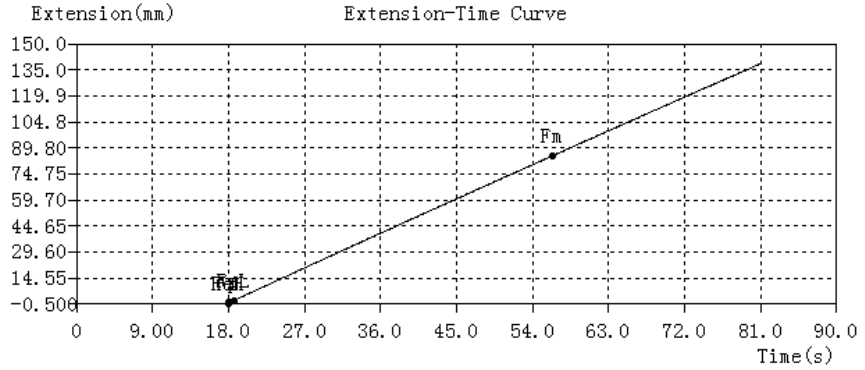
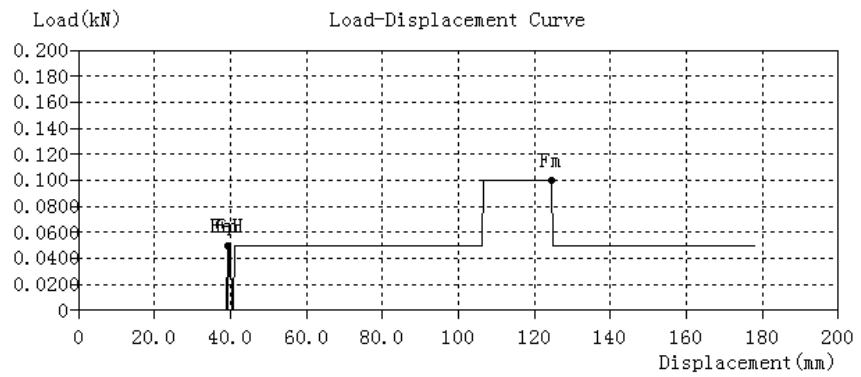
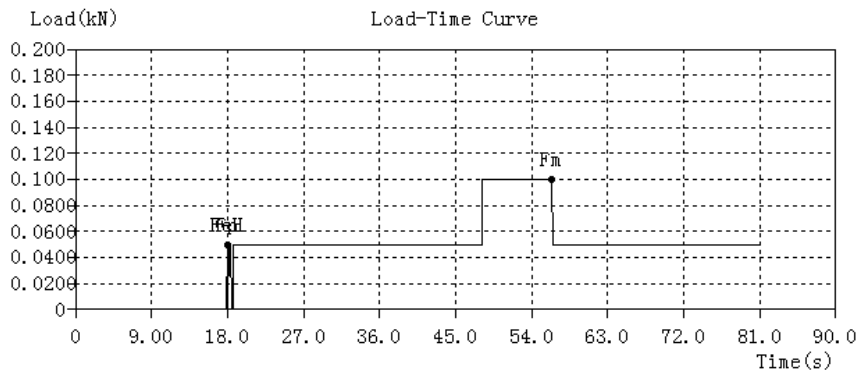


Lampiran 21 Tabel Uji Tarik Tali Push Pull 3

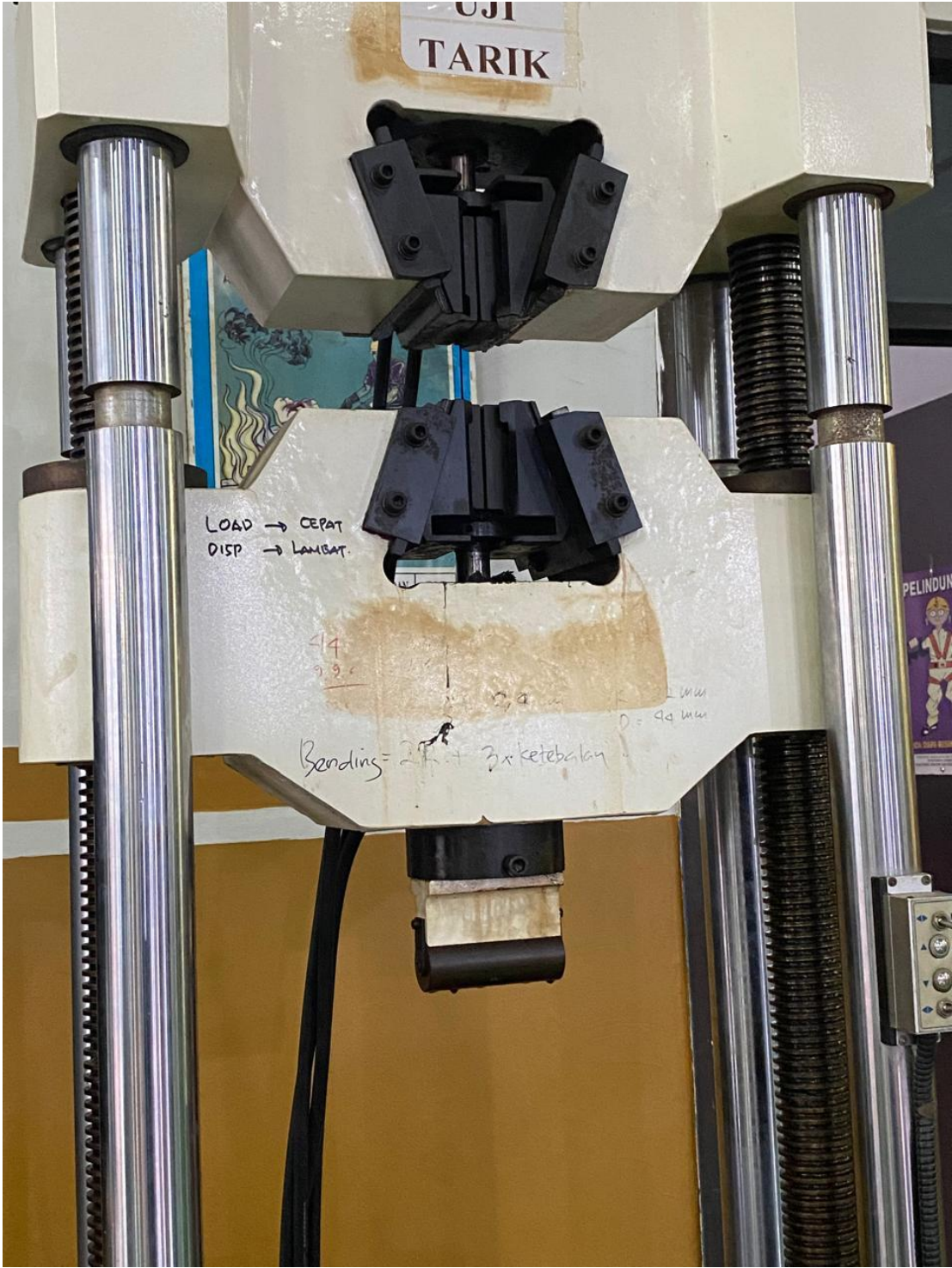
tali pushpull 3

SampleID	tali pushpull 3	TestDate	30/5/2024
Operator		Type	Circle
Size(mm)	2.5	Ao(mm ²)	4.91
Lo(mm)	20	Lu(mm)	
A(%)	/	Au(mm ²)	
Z(%)	/	Fm(kN)	/
Rm(MPa)	/	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	/
Rp(MPa)	/	Ft(kN)	/
Rt(MPa)	/	E(GPa)	/

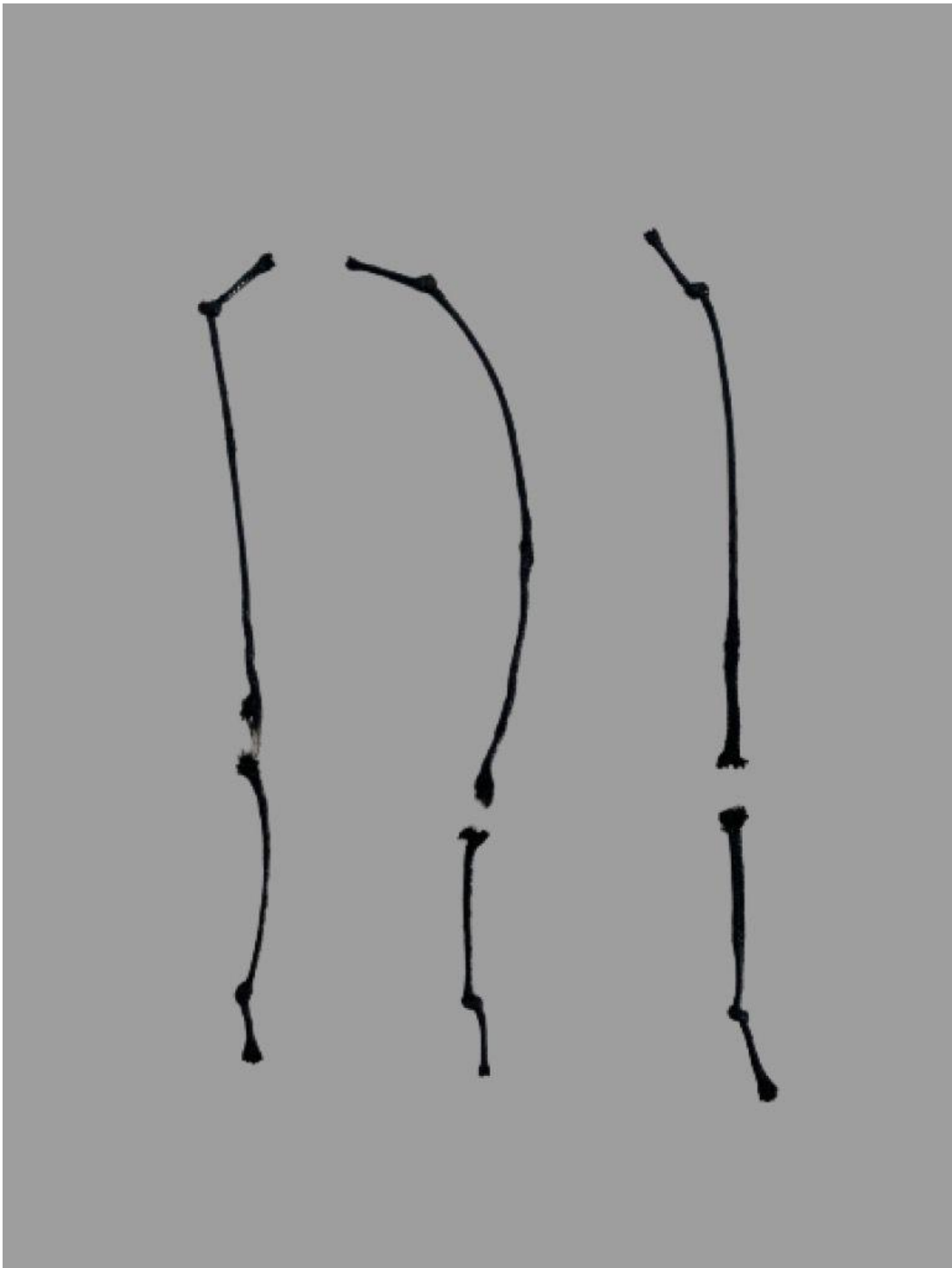




Lampiran 22 Proses Uji Tarik Tali Wax Cord



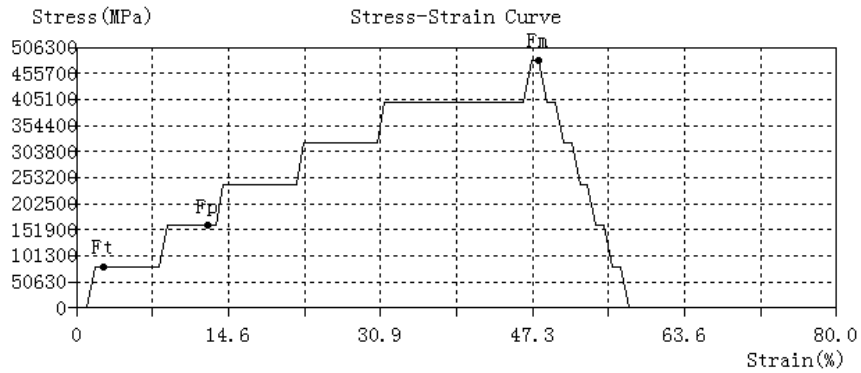
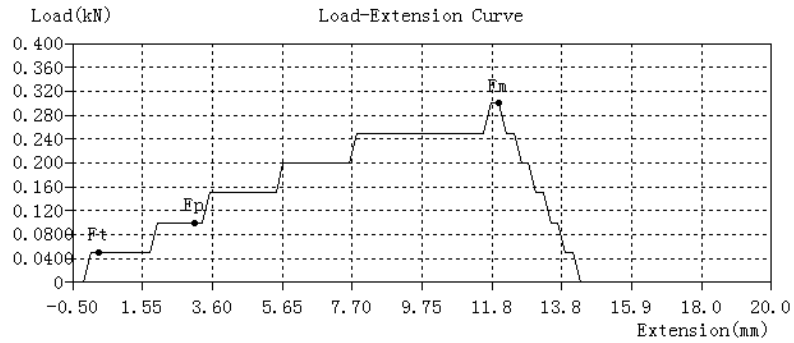
Lampiran 23 Tali *Wax Cord* Uji Tarik

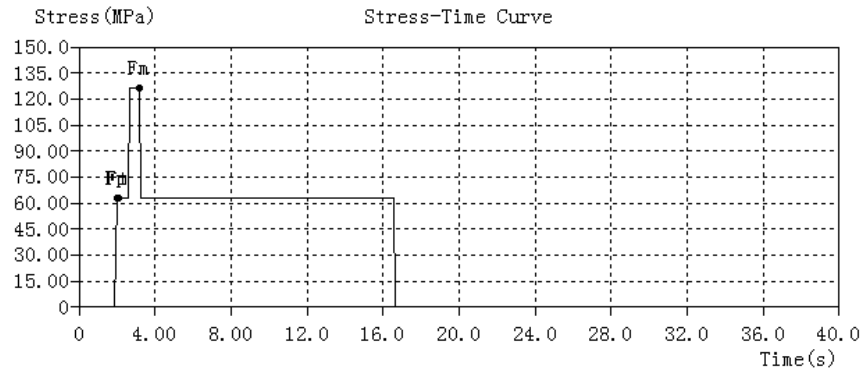
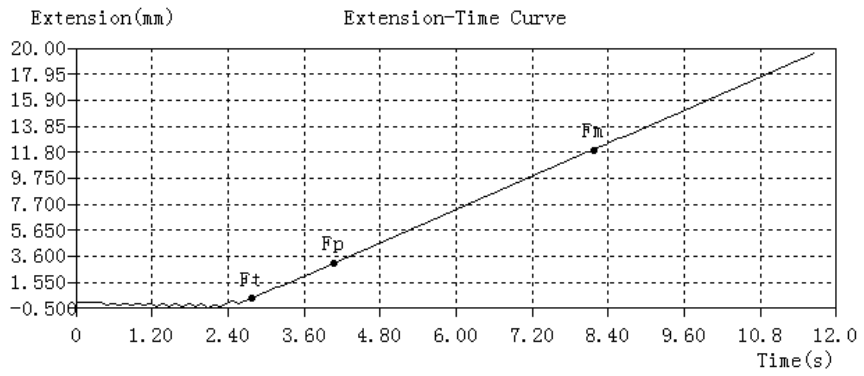
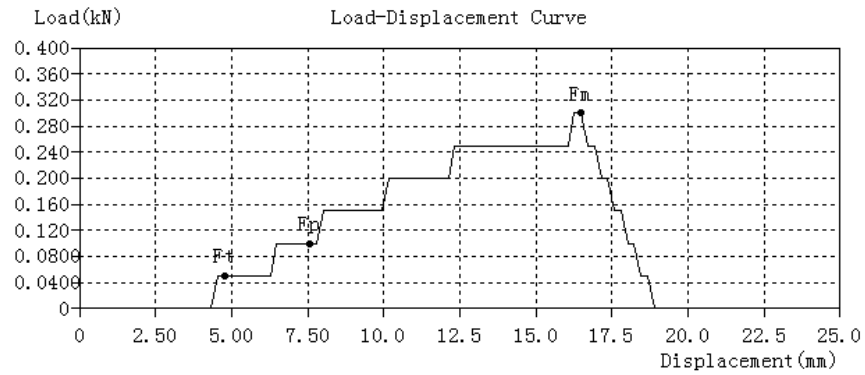
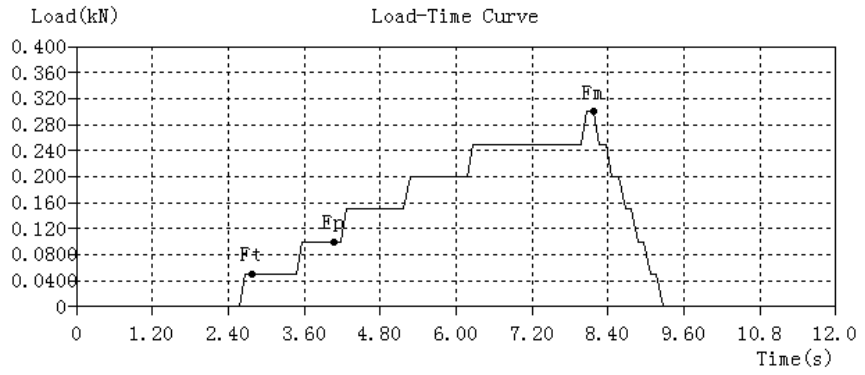


Lampiran 24 Tabel Uji Tarik Tali Wax Cord 1

Tali Waxcord 1

SampleID	Tali Waxcord 1	TestDate	30/5/2024
Operator		Type	Circle
Size(mm)	1	Ao(mm ²)	0.79
Lo(mm)	20	Lu(mm)	
A(%)	/	Au(mm ²)	
Z(%)	/	Fm(kN)	/
Rm(MPa)	/	FeH(kN)	/
UYS(MPa)	/	FeL(kN)	/
LYS(MPa)	/	Fp(kN)	/
Rp(MPa)	/	Ft(kN)	/
Rt(MPa)	/	E(GPa)	/

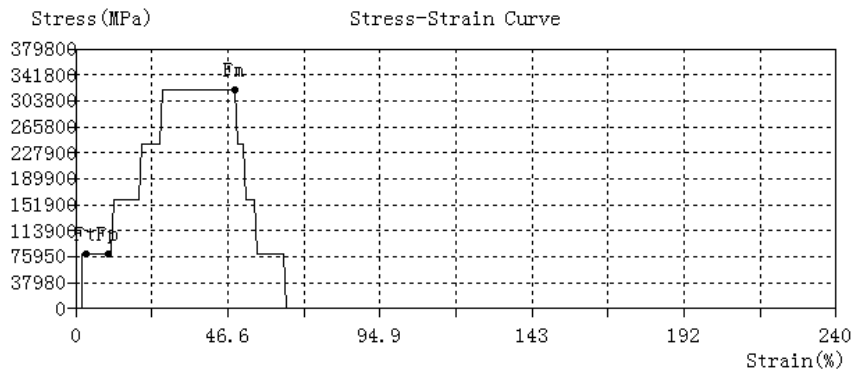
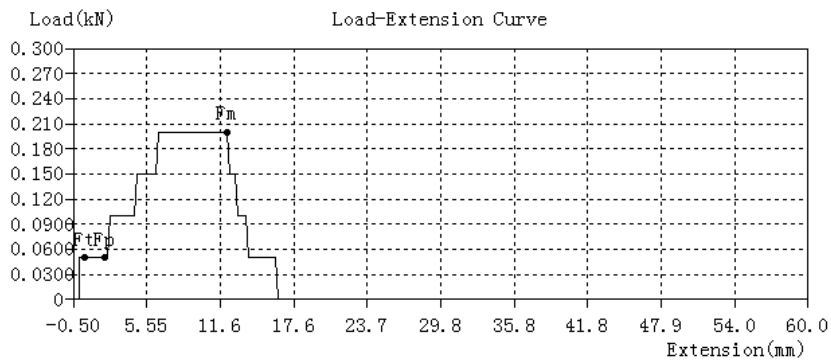


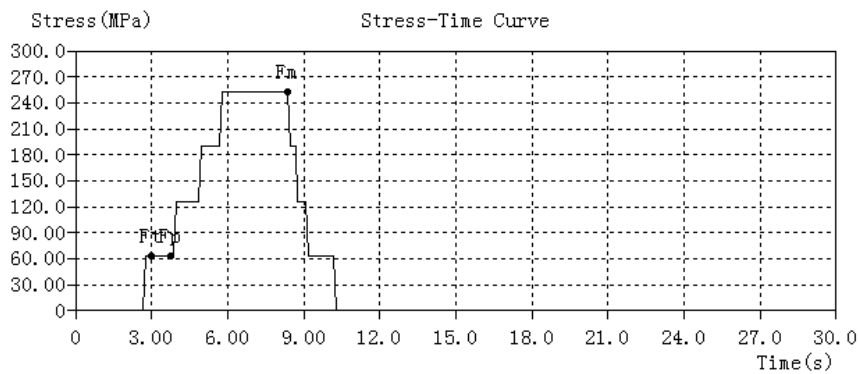
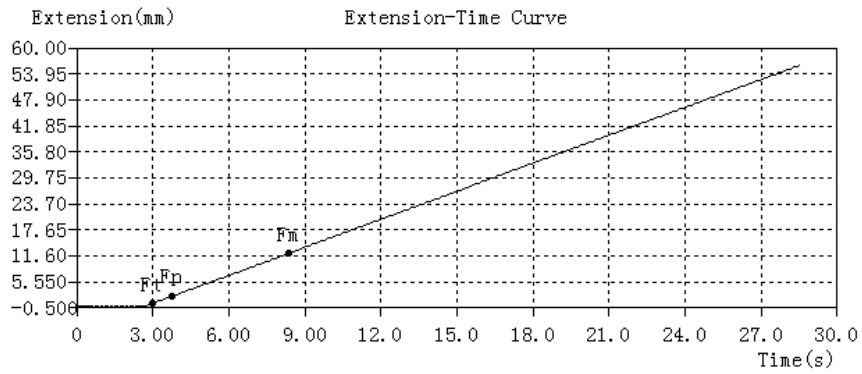
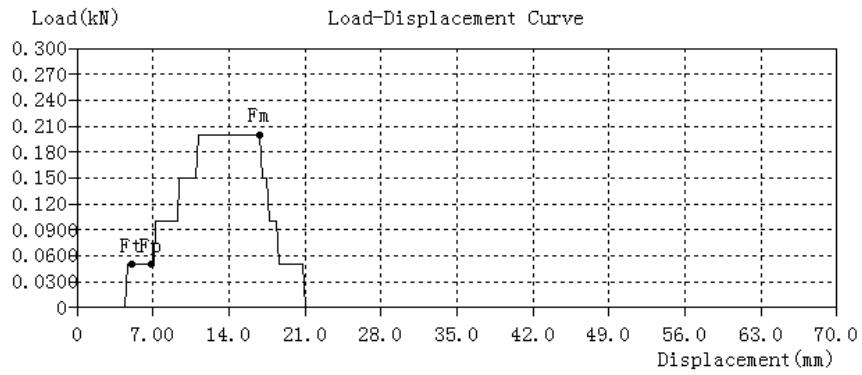
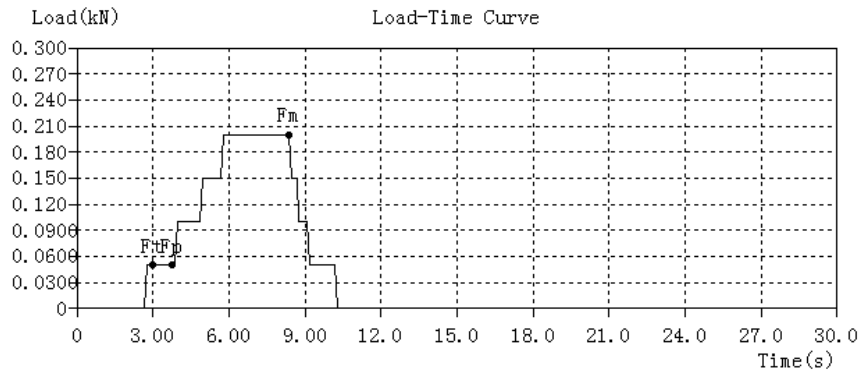


Lampiran 25 Tabel Uji Tarik Tali Wax Cord 2

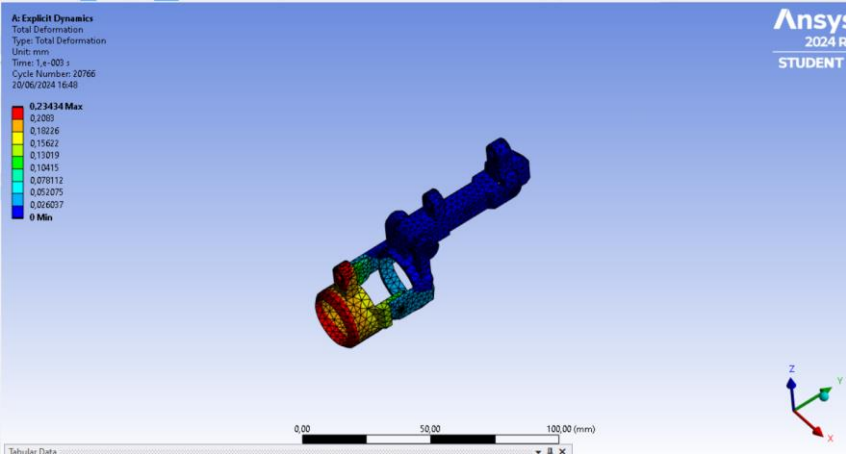
Tali Waxcord 2

SampleID	Tali Waxcord 2	TestDate	30/5/2024
Operator		Type	Circle
Size (mm)	1	Ao (mm ²)	0.79
Lo (mm)	20	Lu (mm)	
A (%)	/	Au (mm ²)	
Z (%)	/	Fm (kN)	/
Rm (MPa)	/	FeH (kN)	/
UYS (MPa)	/	FeL (kN)	/
LYS (MPa)	/	Fp (kN)	/
Rp (MPa)	/	Ft (kN)	/
Rt (MPa)	/	E (GPa)	/

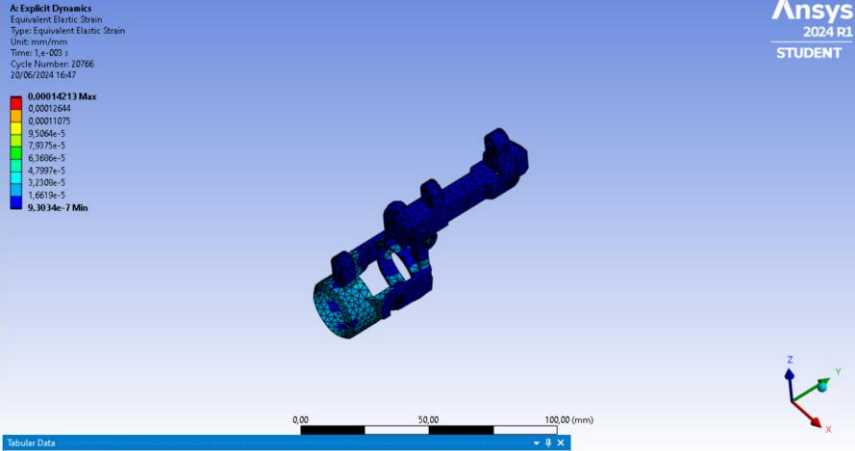




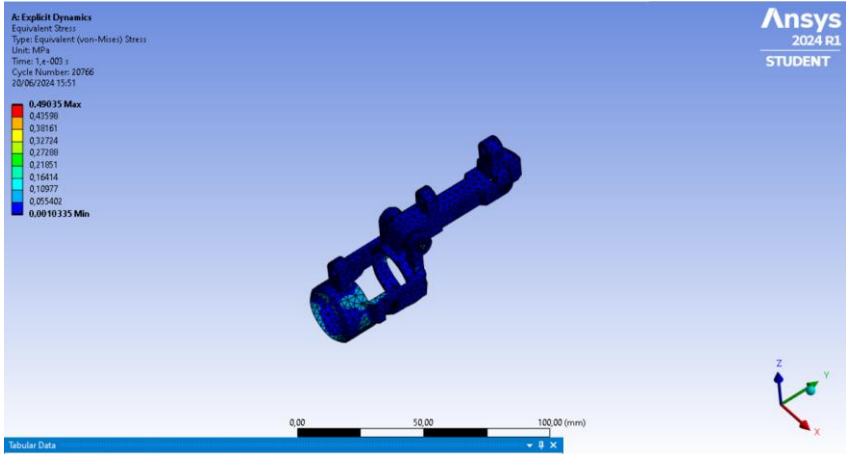
Lampiran 26 Ibu Jari Total Deforma Ekstensi



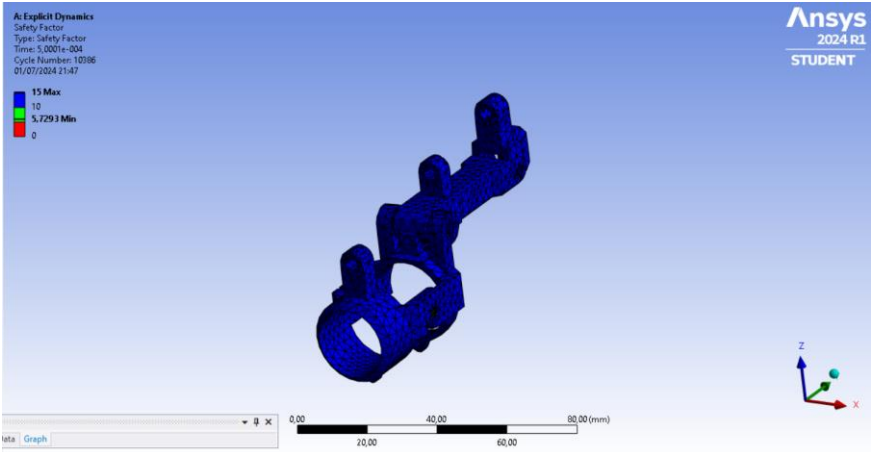
Lampiran 27 Ibu Jari Regangan Ekstensi



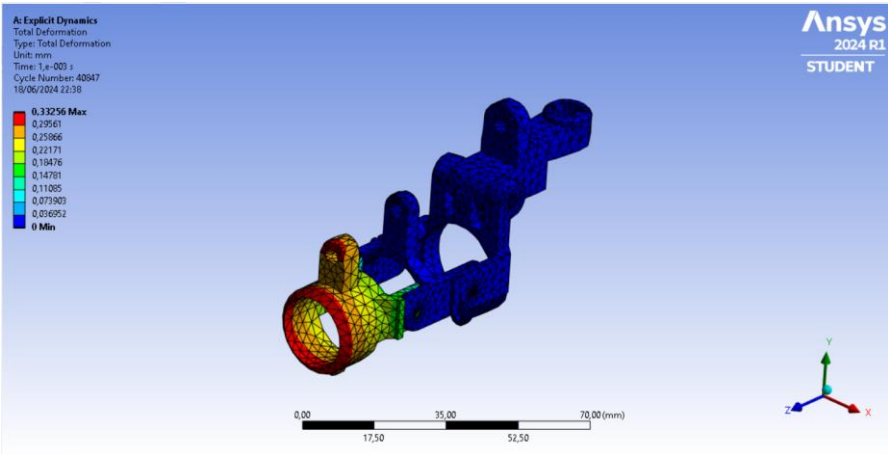
Lampiran 28 Ibu Jari Tegangan Von Mises Ekstensi



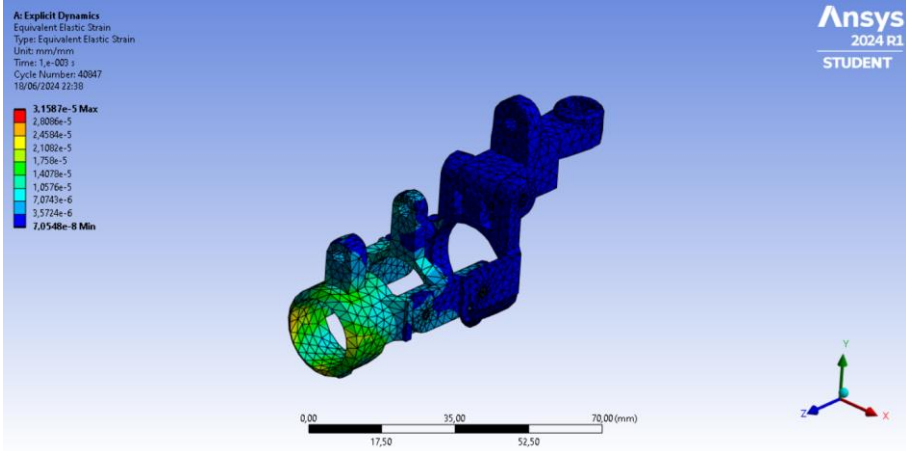
Lampiran 29 Ibu Jari Safety Factor Ekstensi



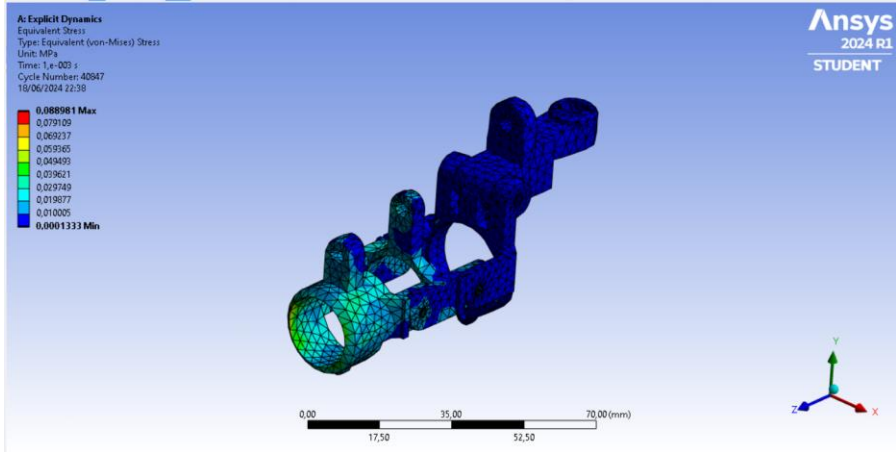
Lampiran 30 Jari telunjuk Total Deformasi Ekstensi



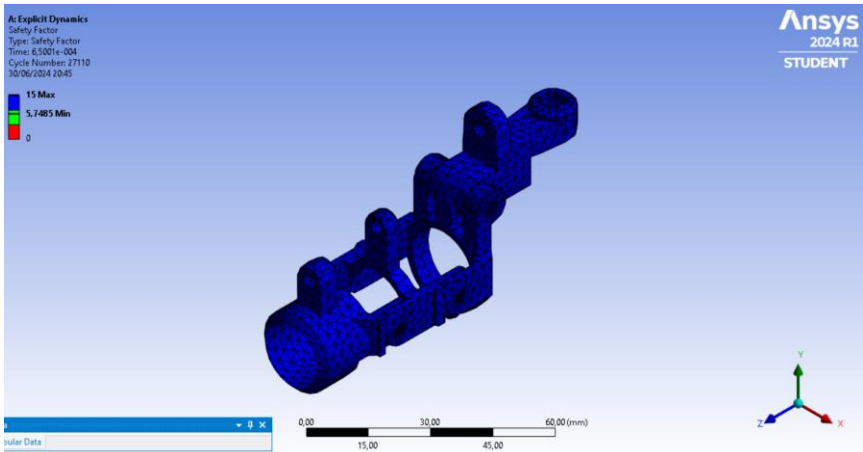
Lampiran 31 Jari telunjuk Regangan Ekstensi



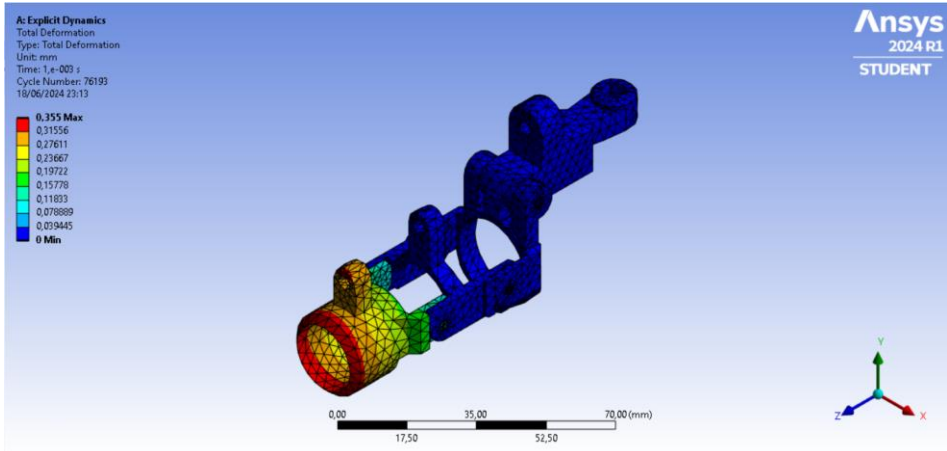
Lampiran 32 Jari Telunjuk Tegangan Von Mises Ekstensi



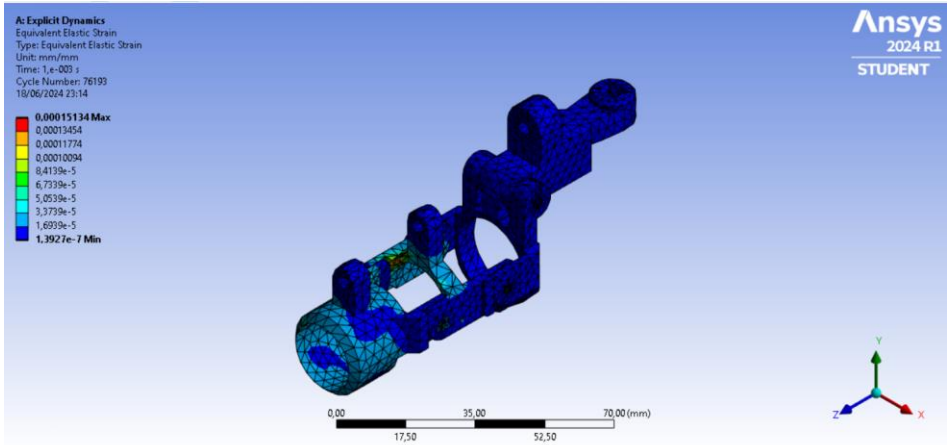
Lampiran 33 Jari Telunjuk Safety Factor Ekstensi



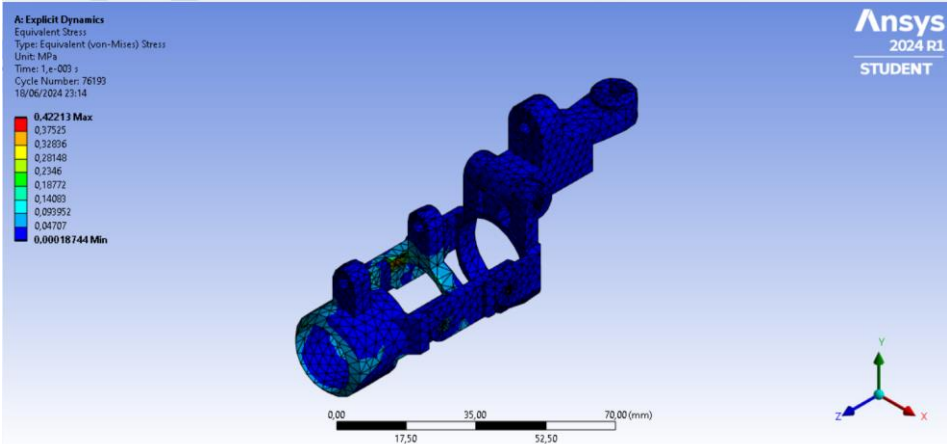
Lampiran 34 Jari Tengah Total Deformasi Ekstensi



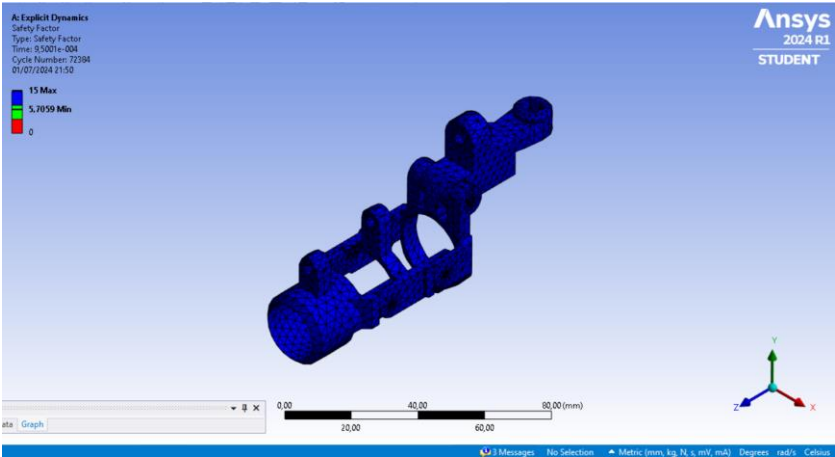
Lampiran 35 Jari Tengah Regangan Ekstensi



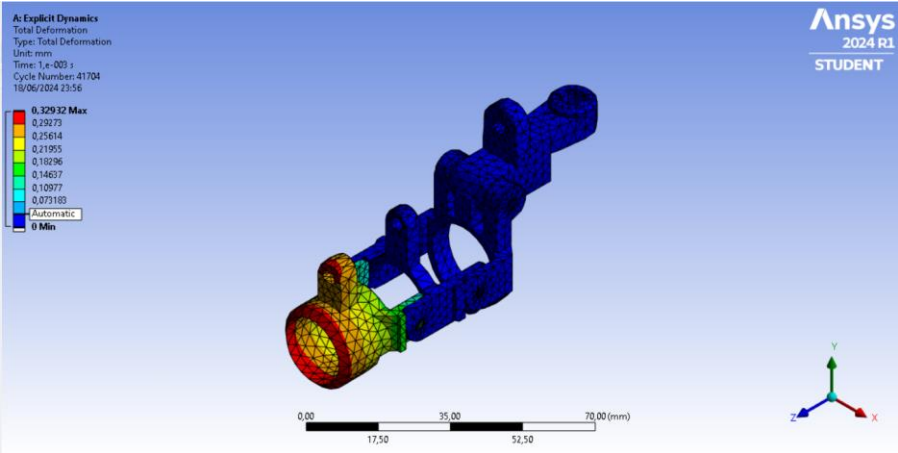
Lampiran 36 Jari Tengah Tegangan Von Mises Ekstensi



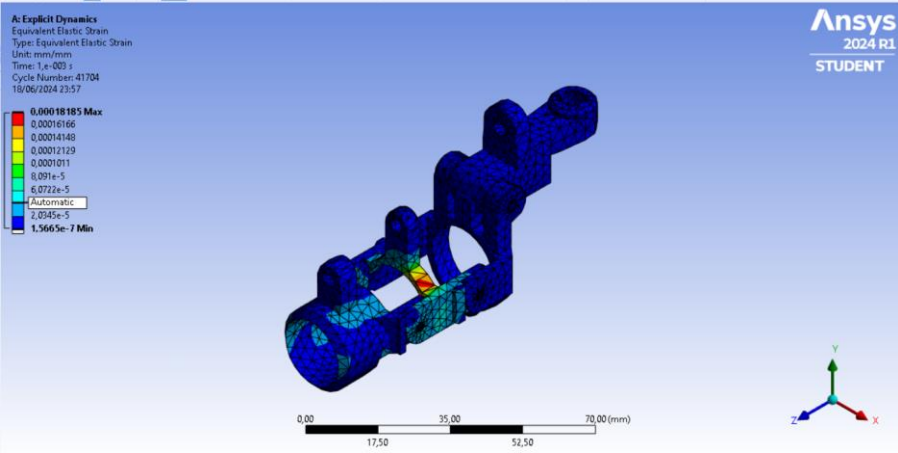
Lampiran 37 Jari Tengah Safety Factor Ekstensi



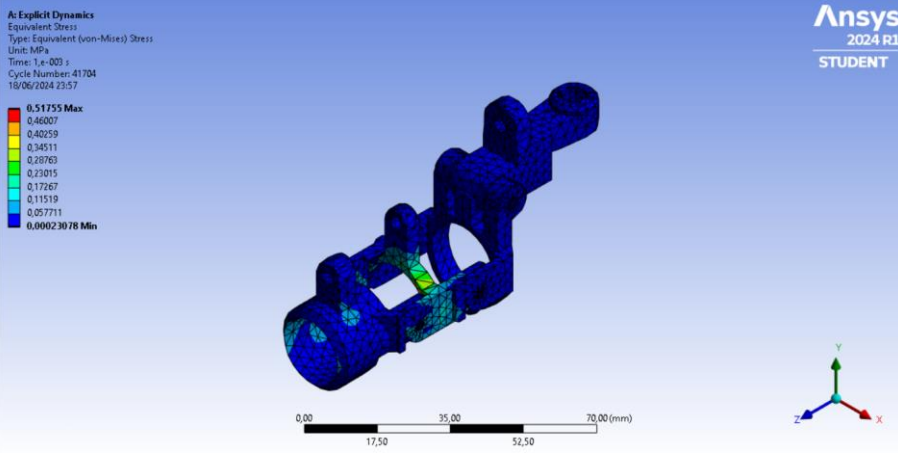
Lampiran 38 Jari Manis Total Deformasi Ekstensi



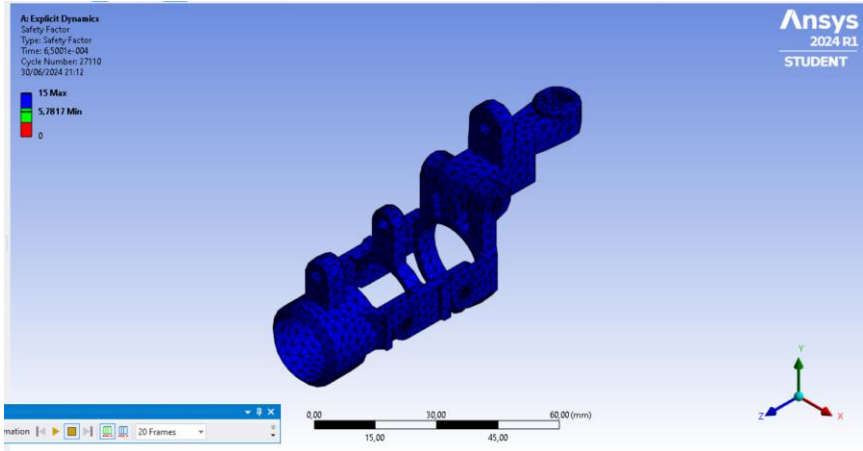
Lampiran 39 Jari Manis Regangan Ekstensi



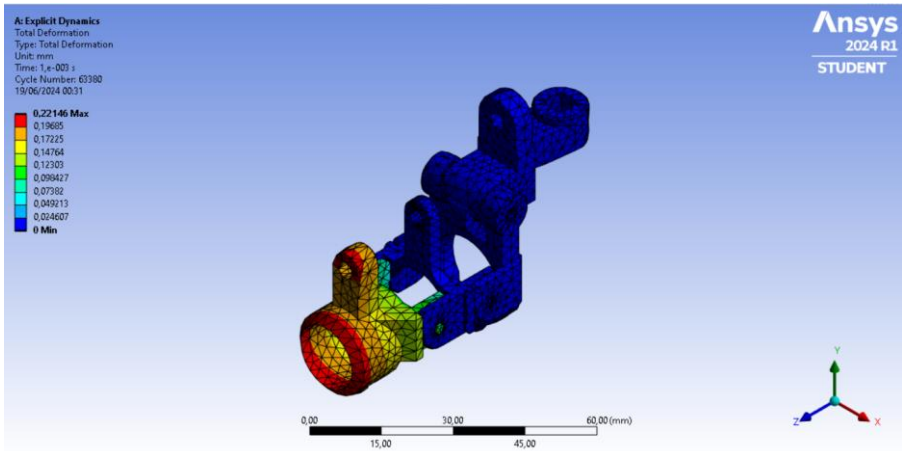
Lampiran 40 Jari Manis Tegangan Von Mises Ekstensi



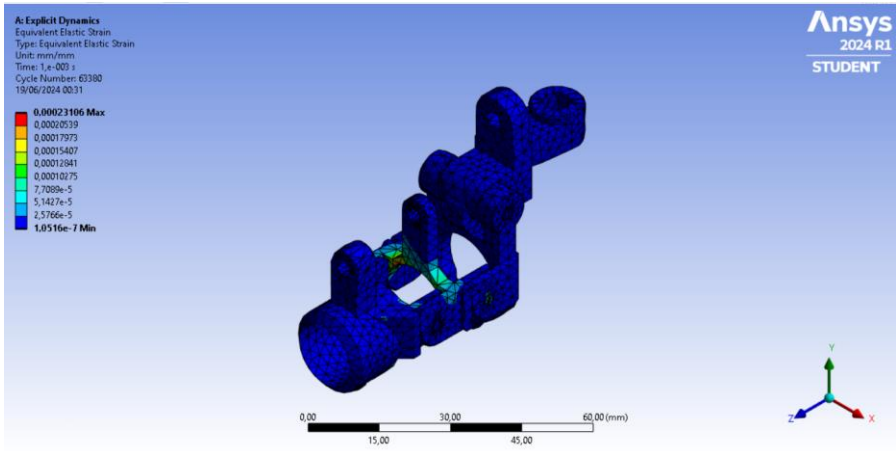
Lampiran 41 Jari Manis Safety Factor Ekstensi



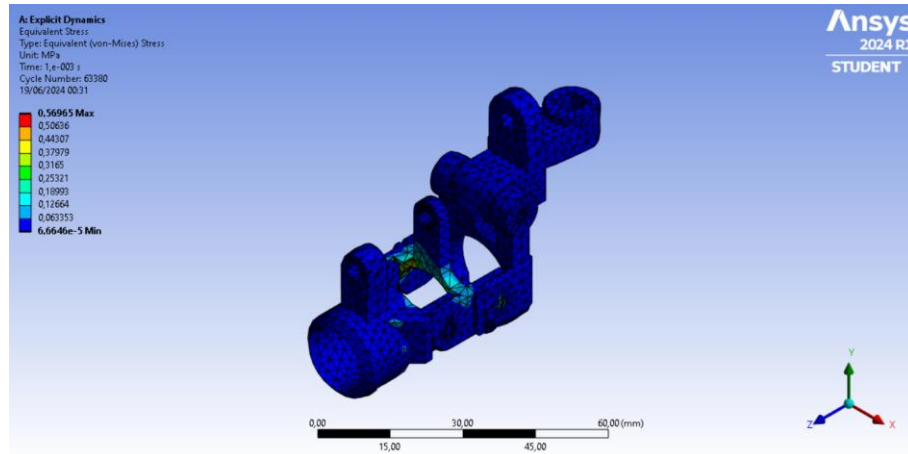
Lampiran 42 Jari Kelingking Total Deformasi Ekstensi



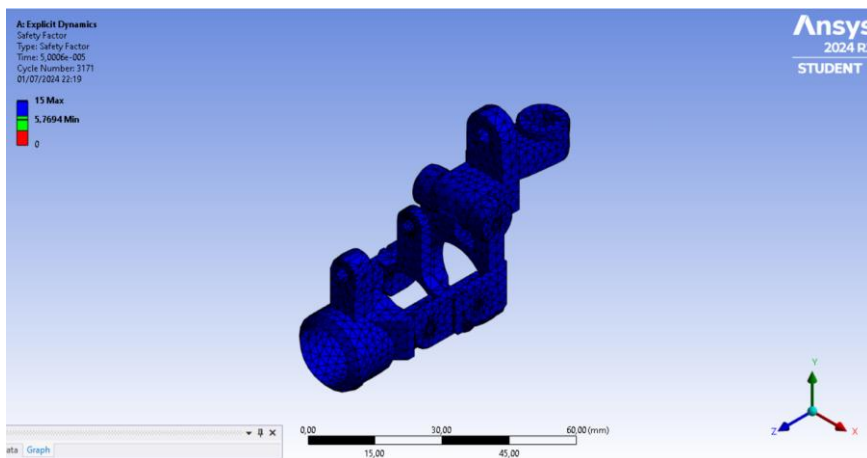
Lampiran 43 Jari Kelingking Regangan Ekstensi



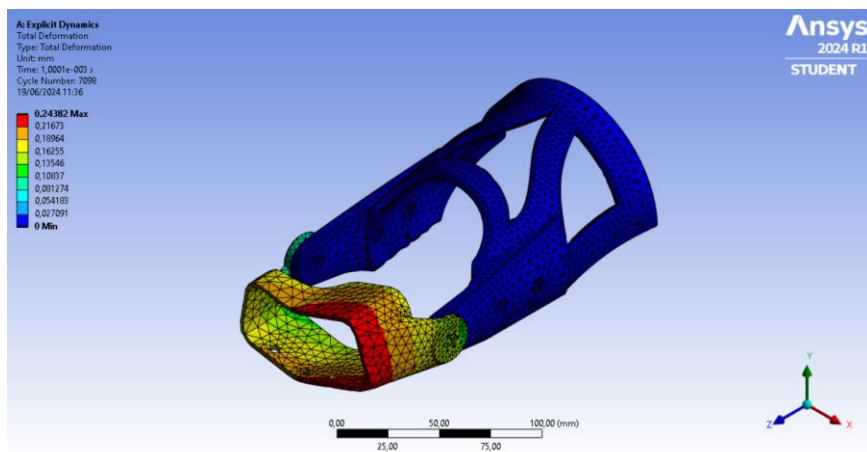
Lampiran 44 Jari Kelingking Tegangan Von Mises Ekstensi



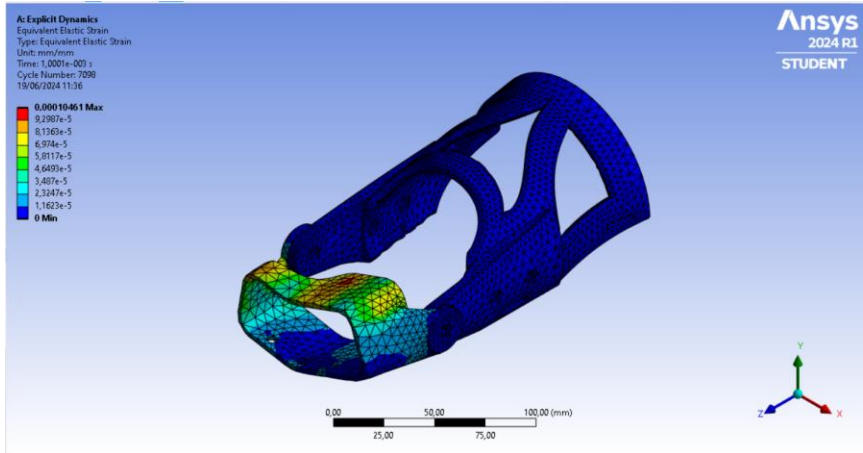
Lampiran 45 Jari kelingking Safety Factor Ekstensi



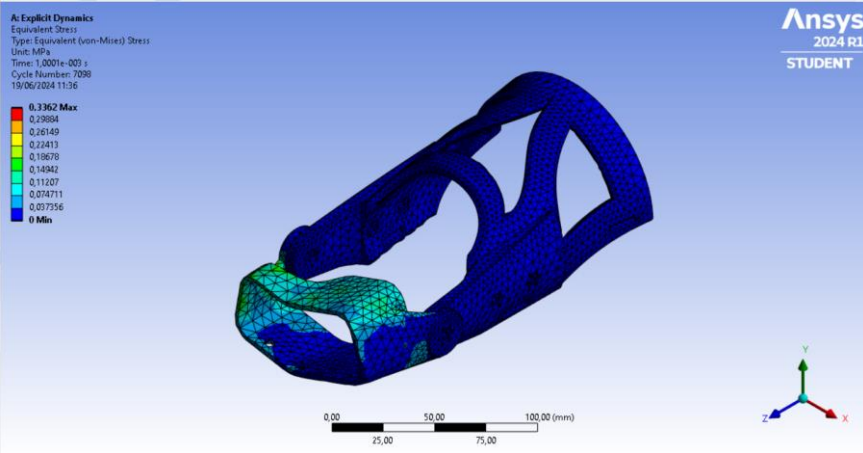
Lampiran 46 Pergelangan Total Deformasi Ekstensi



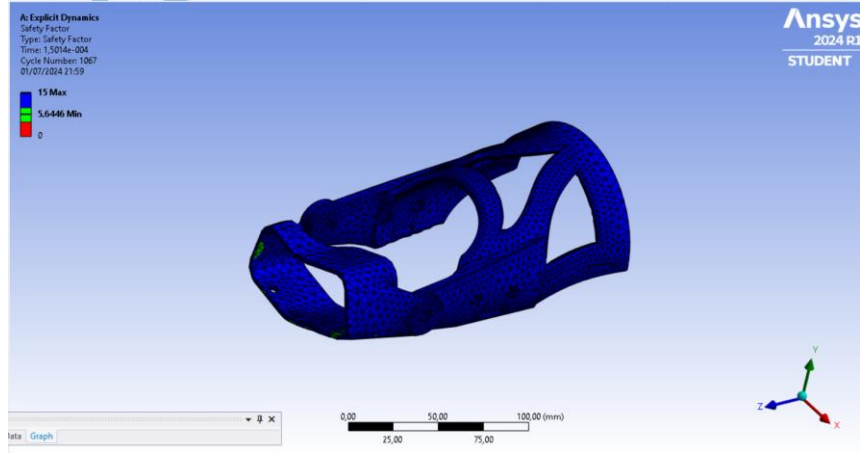
Lampiran 47 Pergelangan Regangan Ekstensi



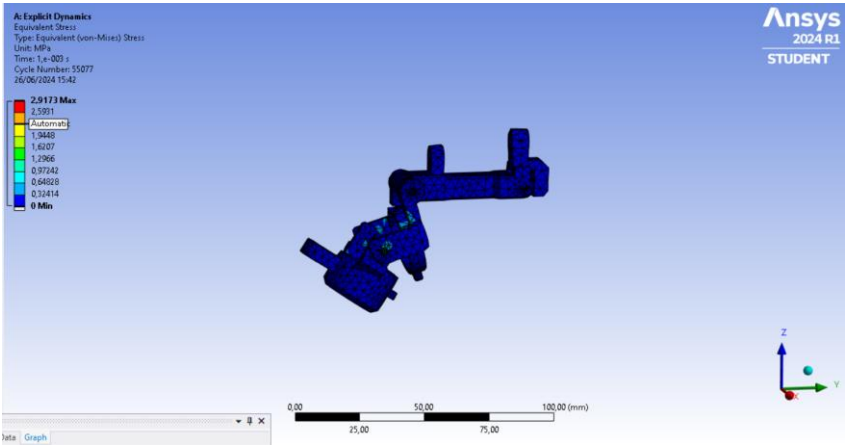
Lampiran 48 Pergelangan Tegangan Von Mises Ekstensi



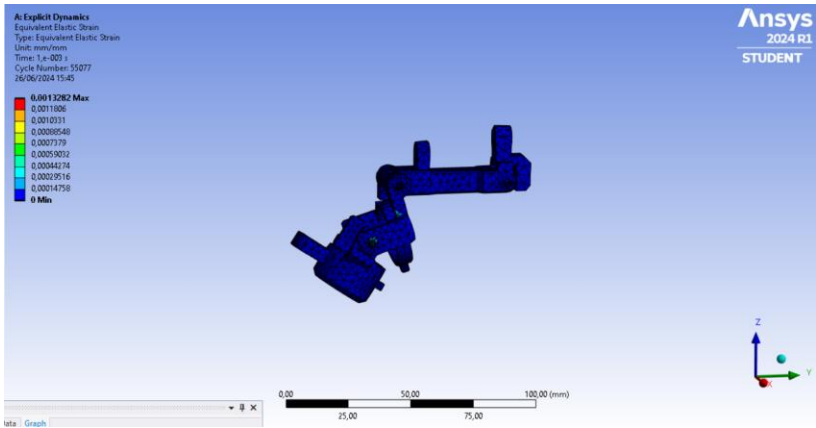
Lampiran 49 Pergelangan Safety Factor Ekstensi



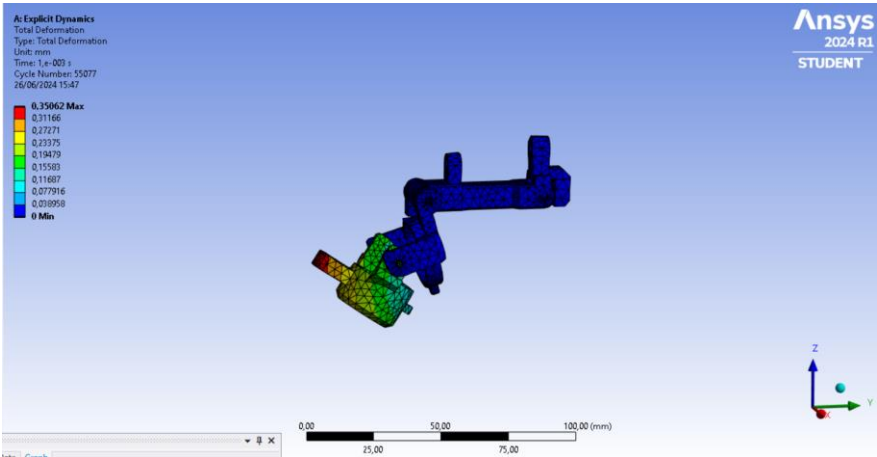
Lampiran 50. Ibu Jari Tegangan von-Mises Fleksi



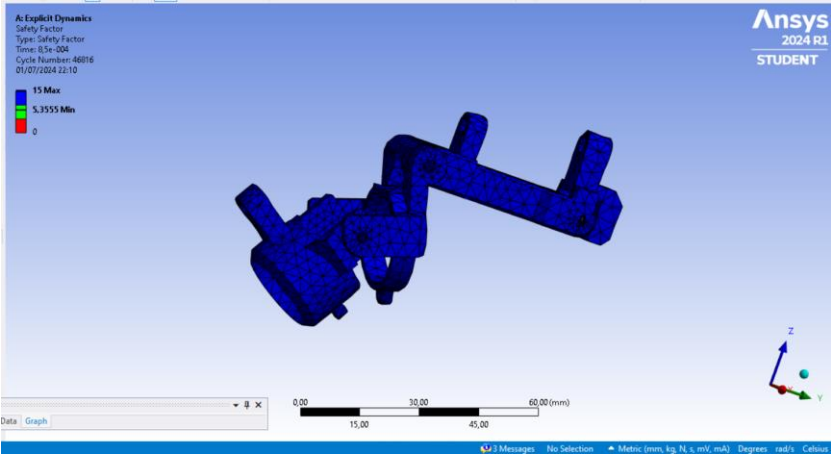
Lampiran 51. Ibu Jari Regangan Fleksi



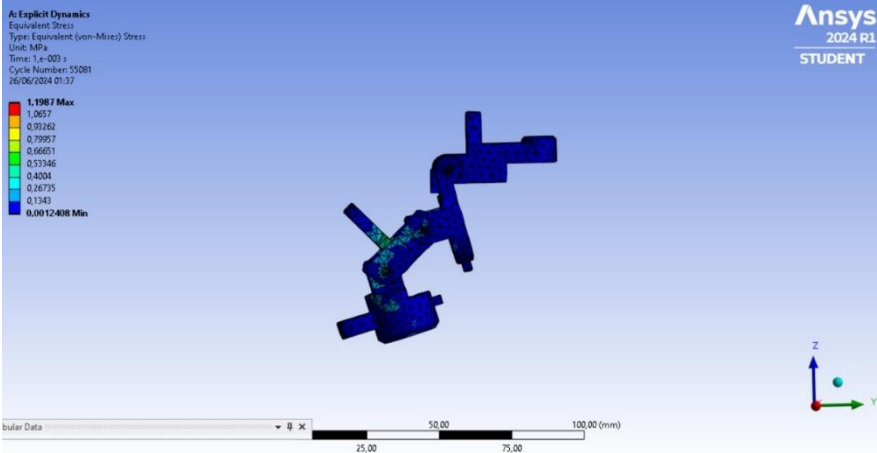
Lampiran 52. Ibu Jari Total Deformasi Fleksi



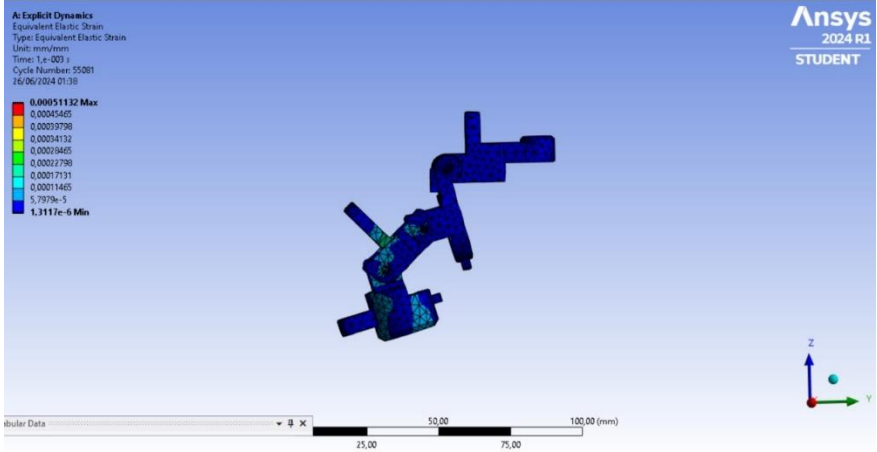
Lampiran 53. Ibu Jari Safety factor Fleksi



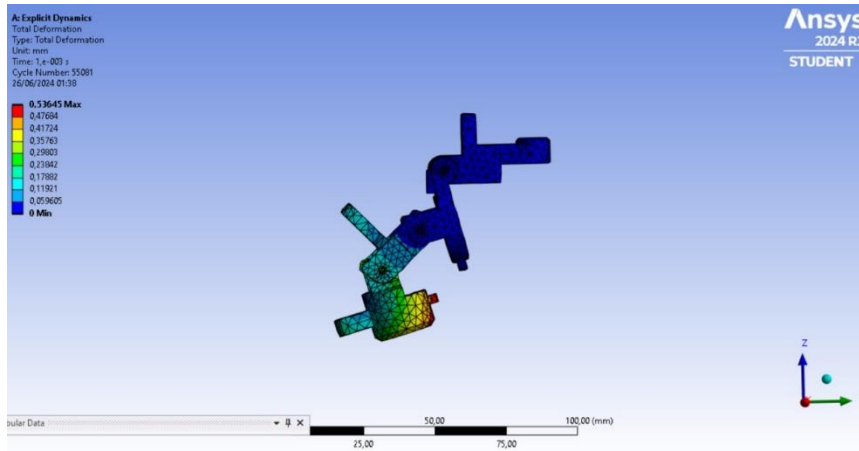
Lampiran 54. Jari Telunjuk Tegangan von-Mises Fleksi



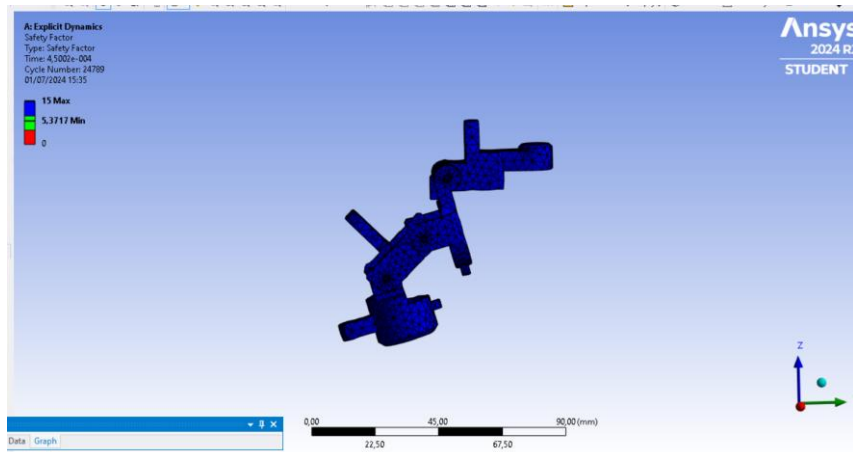
Lampiran 55. Jari Telunjuk Regangan Fleksi



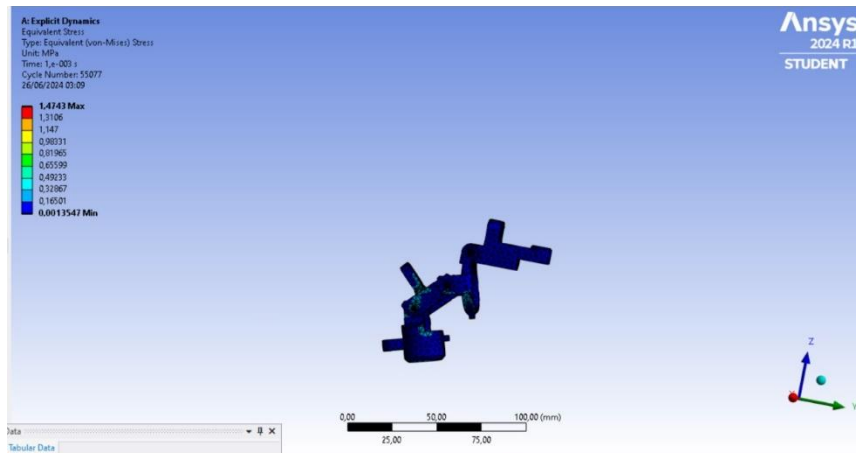
Lampiran 56. Jari Telunjuk Total Deformasi Fleksi



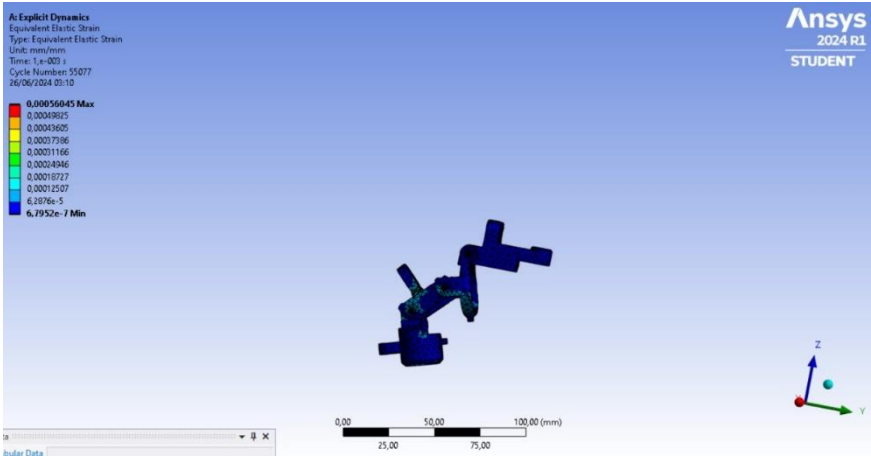
Lampiran 57. Jari Telunjuk Safety Factor Fleksi



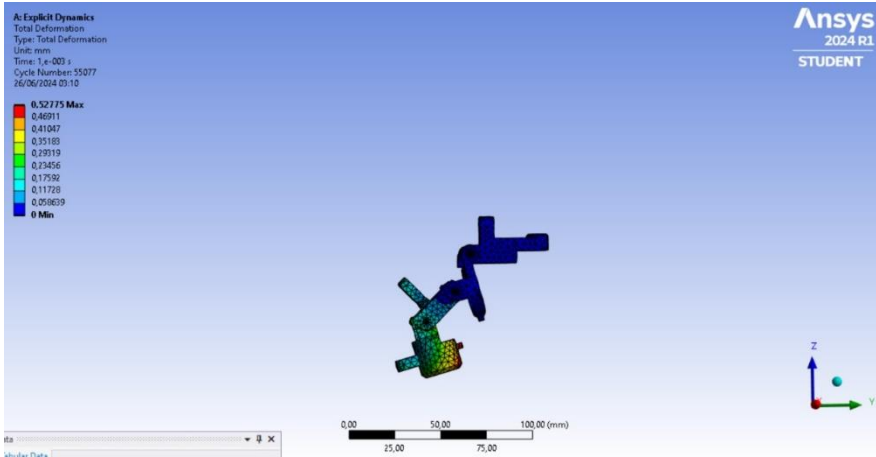
Lampiran 58. Jari Tengah Tegangan von-Mises Fleksi



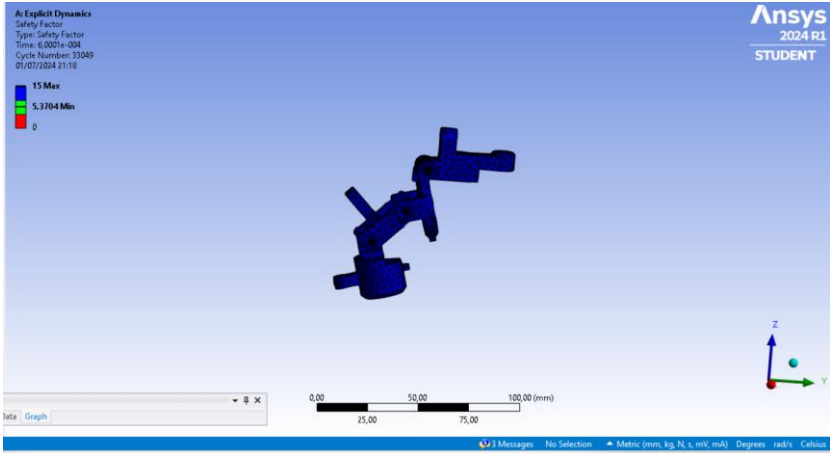
Lampiran 59. Jari Tengah Regangan Fleksi



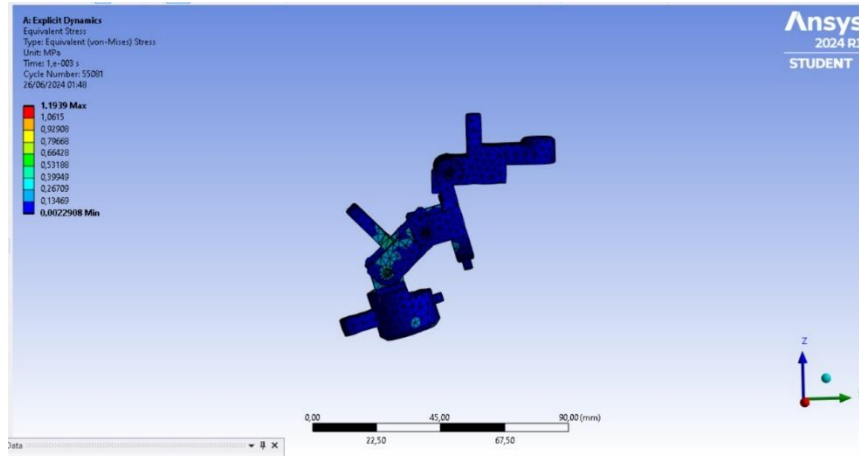
Lampiran 60. Jari Tengah Total Deformasi Fleksi



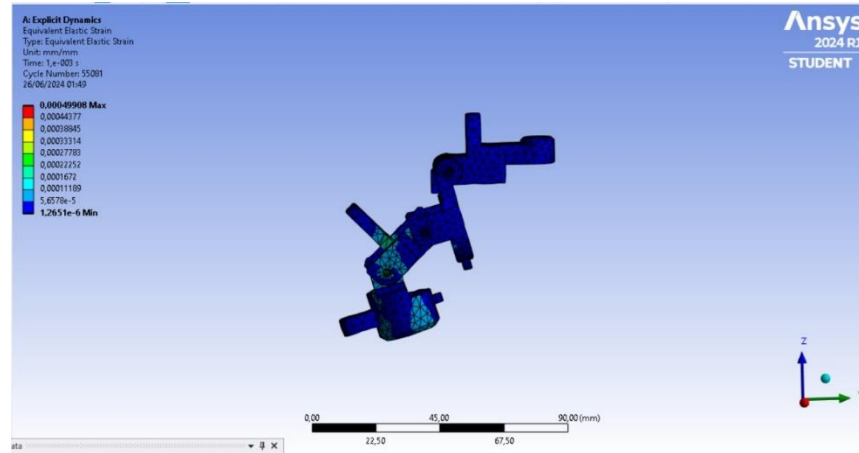
Lampiran 61. Jari Tengah Safety Factor Fleksi



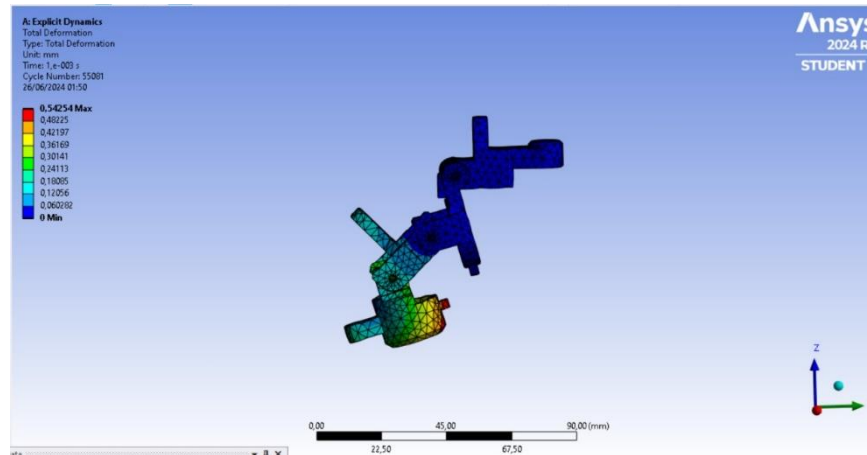
Lampiran 62. Jari Manis Tegangan von-Misen Fleksi



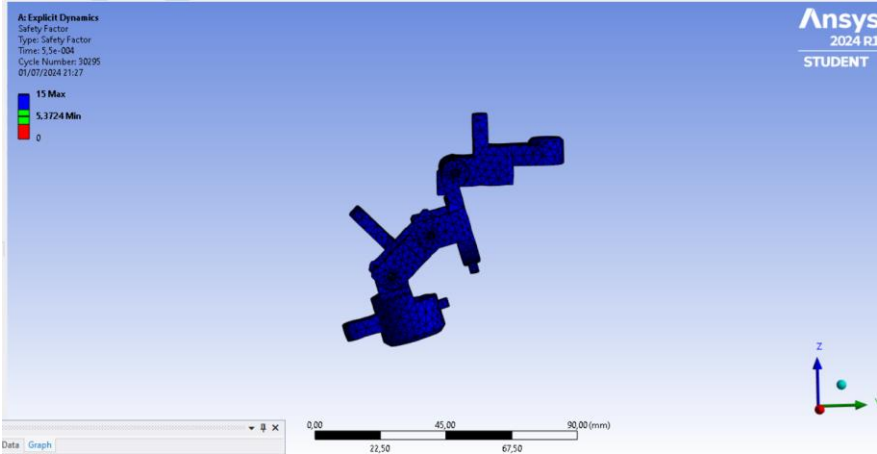
Lampiran 63. Jari Manis Regangan Fleksi



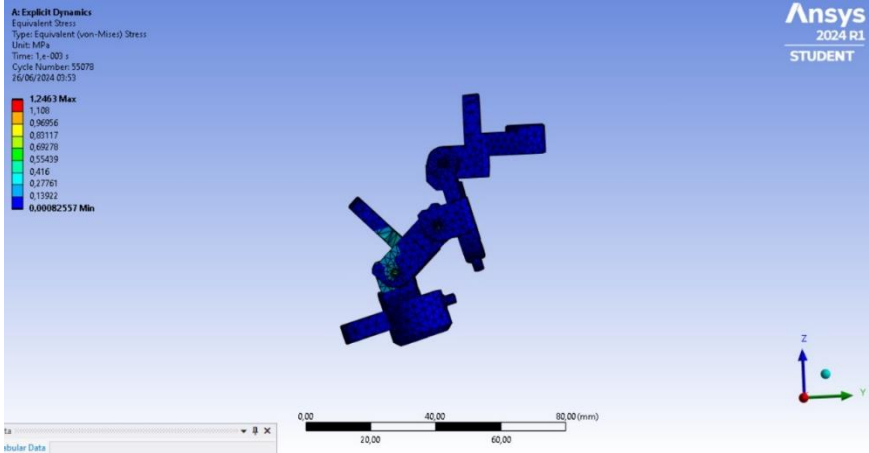
Lampiran 64. Jari Manis Total Deformasi Fleksi



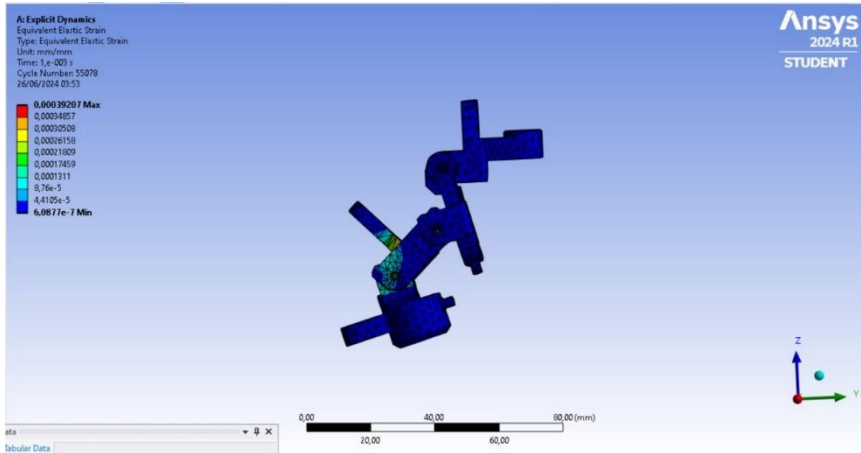
Lampiran 65. Jari Manis Safety Factor Fleksi



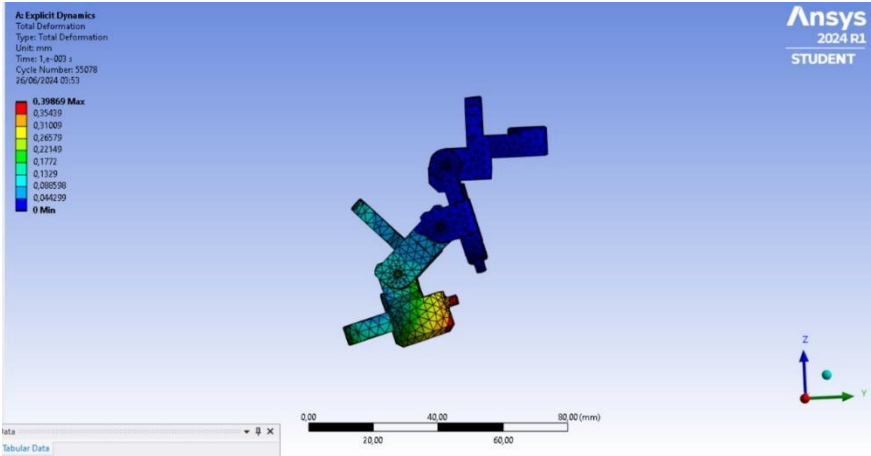
Lampiran 66. Jari Kelingking Tegangan von-Mises Fleksi



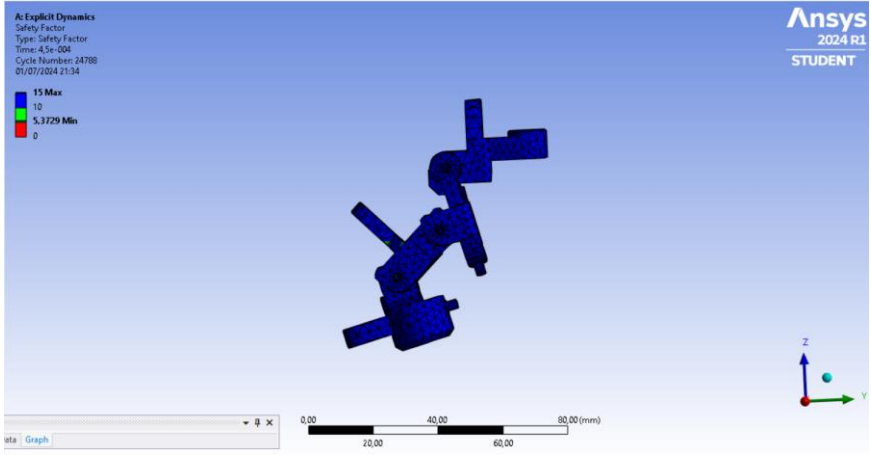
Lampiran 67. Jari Kelingking Regangan Fleksi



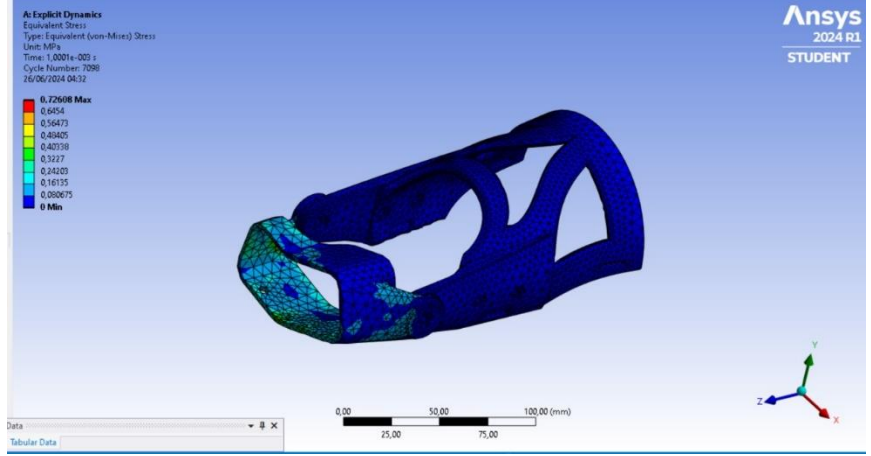
Lampiran 68. Jari Kelingking Total Deformasi Fleksi



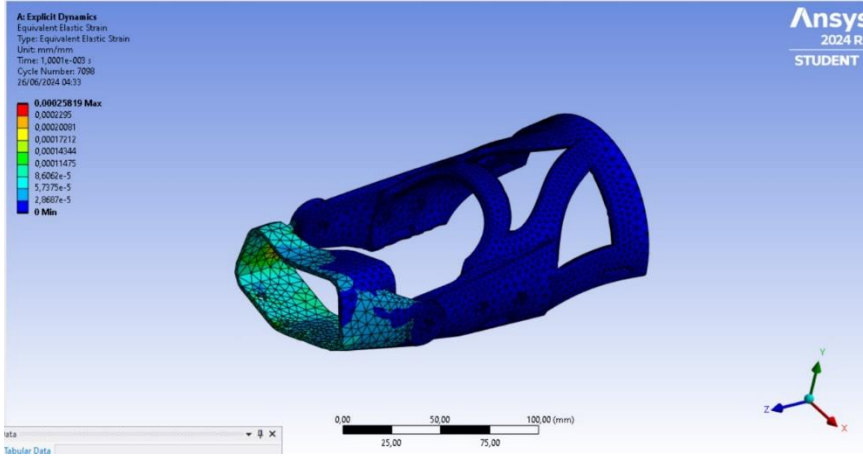
Lampiran 69. Jari Kelingking Safety Factor Fleksi



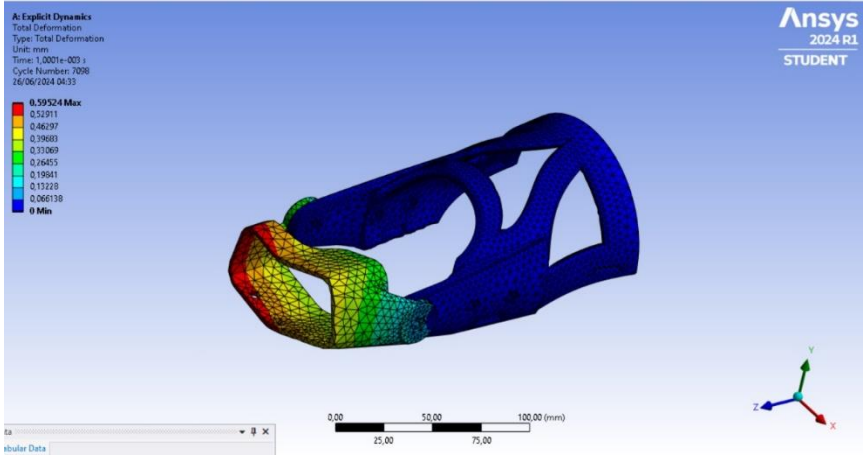
Lampiran 70. Pergelangan Tegangan von-Mises Fleksi



Lampiran 71. Pergelangan Regangan Fleksi



Lampiran 72 Pergelangan Total Deformasi Fleksi



Lampiran 73 Pergelangan Safety Factor Fleksi

