ภาคผนวก ก
ตัวอย่างอินพุตไฟล์สำหรับชิ้นงานแบบต่างๆ

ตัวอย่างอินพุตไฟล์สำหรับคำนวณค่าสัมประสิทธิ์พลังงานความเครียดเมื่อรับแรงดึง

```
*HEADING
Single element model to test fit of hyperelastic test data
Tension Polynomial N=2
*RESTART,WRITE,FREQUENCY=100
*NODE,                          NSET=ALL
1,0.,0.,0.
2,1.,0.,0.
3,1.,1.,0.
4,0.,1.,0.
5,0.,0.,1.
6,1.,0.,1.
7,1.,1.,1.
8,0.,1.,1.
*NSET,                          NSET=FACE1
1,2,3,4
*NSET,                          NSET=FACE2
5,6,7,8
*NSET,                          NSET=FACE3
1,2,5,6
*NSET,                          NSET=FACE4
2,3,6,7
*NSET,                          NSET=FACE5
3,4,7,8
*NSET,                          NSET=FACE6
4,1,8,5
*EQUATION
2
FACE2,1,1, 2,1,-1
```

```
*ELEMENT,    TYPE=C3D8RH,          ELSET=ONE
1,1,2,3,4,5,6,7,8
*SOLID SECTION,ELSET=ONE,          MATERIAL=TREL
*MATERIAL,NAME=TREL
*HYPERELASTIC,POLYNOMIAL,N=2,TEST DATA INPUT
*UNIAXIAL TEST DATA
0.0000,          0.0000
0.2581,          0.0500
0.4498,          0.1000
0.5955,          0.1500
0.7114,          0.2000
0.8102,          0.2500
0.9012,          0.3000
0.9914,          0.3500
1.0854,          0.4000
1.1865,          0.4500
1.2970,          0.5000
1.4185,          0.5500
1.5530,          0.6000
1.7029,          0.6500
1.8718,          0.7000
2.0649,          0.7500
2.2898,          0.8000
2.5567,          0.8500
2.8791,          0.9000
**
*STEP,NLGEOM,INC=50000
Step 1:Uniaxial Tension
*STATIC,DIRECT
.02,1.8
```

```
*BOUNDARY,OP=NEW
FACE1,3
FACE3,2
FACE6,1
FACE4,1,1,1.8
*ENERGY PRINT
*EL PRINT,FREQUENCY=500
S
E
*NODE PRINT,FREQUENCY=500
U,RF
*NODE FILE,FREQUENCY=1
U,RF
*END STEP
*STEP,NLGEOM,INC=20
Step 2: Unload
*STATIC,DIRECT
.1,1.8
*BOUNDARY,OP=MOD
FACE4,1
*END STEP
```

ตัวอย่างอินพุตไฟล์สำหรับคำนวณค่าสัมประสิทธิ์พลังงานความเครียดเมื่อรับแรงกด

```
*HEADING
Single element model to test fit of hyperelastic test data
Compression Polynomial N=2
*RESTART,WRITE,FREQUENCY=100
*NODE,                    NSET=ALL
1,0.,0.,0.
2,1.,0.,0.
3,1.,1.,0.
4,0.,1.,0.
5,0.,0.,1.
6,1.,0.,1.
7,1.,1.,1.
8,0.,1.,1.
*NSET,                    NSET=FACE1
1,2,3,4
*NSET,                    NSET=FACE2
5,6,7,8
*NSET,                    NSET=FACE3
1,2,5,6
*NSET,                    NSET=FACE4
2,3,6,7
*NSET,                    NSET=FACE5
3,4,7,8
*NSET,                    NSET=FACE6
4,1,8,5
*EQUATION
2
FACE2,1,1, 2,1,-1
```

```
*ELEMENT,    TYPE=C3D8RH,          ELSET=ONE
1,1,2,3,4,5,6,7,8
*SOLID SECTION,ELSET=ONE,          MATERIAL=TREL
*MATERIAL,NAME=TREL
*HYPERELASTIC,POLYNOMIAL,N=2,TEST DATA INPUT
*UNIAXIAL TEST DATA
0.0000,          0.0000
-0.1251,         -0.0250
-0.2430,         -0.0500
-0.3561,         -0.0750
-0.4668,         -0.1000
-0.5774,         -0.1250
-0.6902,         -0.1500
-0.8076,         -0.1750
-0.9319,         -0.2000
-1.0654,         -0.2250
-1.2106,         -0.2500
-1.3697,         -0.2750
-1.5450,         -0.3000
-1.7390,         -0.3250
-1.9540,         -0.3500
-2.1922,         -0.3750
-2.4561,         -0.4000
-2.7480,         -0.4250
-3.0702,         -0.4500
-3.4251,         -0.4750
**
*STEP,NLGEOM,INC=50000
Step 1:Uniaxial Compression
*STATIC,DIRECT
```

.02,1.8

*BOUNDARY,OP=NEW

FACE1,3

FACE3,2

FACE6,1

FACE4,1,1,1.8

*ENERGY PRINT

*EL PRINT,FREQUENCY=500

S

E

*NODE PRINT,FREQUENCY=500

U,RF

*NODE FILE,FREQUENCY=1

U,RF

*END STEP

*STEP,NLGEOM,INC=20

Step 2: Unload

*STATIC,DIRECT

.1,1.8

*BOUNDARY,OP=MOD

FACE4,1

*END STEP

ตัวอย่างอินพุตไฟล์สำหรับชิ้นงานยางทดสอบแรงดึง

```
*HEADING
Model Rubber Tension Test Polynomial N=2
Unit SI mm, MPa
PERFECT BONDING
*NODE
1,0.,0.,0.
801,6.,0.,0.
4001,0.,3.,0.
4801,6.,3.,0.
49,0.,0.,40.
849,6.,0.,40.
4049,0.,3.,40.
4849,6.,3.,40.
**
*NGEN,                NSET=F1
1,801,100
*NGEN,                NSET=B1
4001,4801,100
*NFILL,               NSET=BASE1
F1,B1,4,1000
*NGEN,                NSET=F2
49,849,100
*NGEN,                NSET=B2
4049,4849,100
*NFILL,               NSET=BASE2
F2,B2,4,1000
*NFILL,               NSET=ALL
BASE1,BASE2,48,1
```

```
**
**
*ELEMENT,          TYPE=C3D20,          ELSET=STEEL1
1,1,201,2201,2001,3,203,2203,2003,101,1201,
2101,1001,103,1203,2103,1003,2,202,2202,2002
*ELGEN,            ELSET=STEEL1
1,4,200,100,2,2000,1000
*ELEMENT,          TYPE=C3D20RH,        ELSET=RUBBER
2,3,203,2203,2003,5,205,2205,2005,103,1203,
2103,1003,105,1205,2105,1005,4,204,2204,2004
*ELGEN,            ELSET=RUBBER
2,4,200,100,2,2000,1000,22,2,1
*ELEMENT,          TYPE=C3D20,          ELSET=STEEL2
24,47,247,2247,2047,49,249,2249,2049,147,1247,
2147,1047,149,1249,2149,1049,48,248,2248,2048
*ELGEN,            ELSET=STEEL2
24,4,200,100,2,2000,1000
**
*SOLID SECTION,    ELSET=STEEL1         ,MATERIAL=STEEL
*SOLID SECTION,    ELSET=STEEL2,        MATERIAL=STEEL
*SOLID SECTION,    ELSET=RUBBER,        MATERIAL=RUBBER
*MATERIAL,         NAME=RUBBER
*HYPERELASTIC,N=2
-2.042,3.088,1.414,-3.878,3.678
*MATERIAL,         NAME=STEEL
*ELASTIC
200E3,0.3
*STEP,NLGEOM
*STATIC
*BOUNDARY
```

```
BASE1, ENCASTRE
*DLOAD
STEEL2,P2,-2.0
*RESTART, WRITE
*NODE PRINT
U
RF
*EL PRINT
S
*END STEP
```

ตัวอย่างอินพุตไฟล์สำหรับชิ้นงานยางขนาดความกว้าง 30 mm หนา 10 mm เชื่อมต่อด้วยกาวแห้งเร็ว รับแรงกด 1 MPa

*HEADING

Design element

Unit SI mm, MPa

Rectangular Bonded Disk, h=10 mm, D=30 mm, Instant Glue

*NODE

1,0.,0.,0.

11,15.,0.,0.

511,15.,15.,0.

501,0.,15.,0.

12,20.,0.,0.

512,20.,15.,0.

551,0.,20.,0.

561,15.,20.,0.

562,20.,20.,0.

1001,0.,0.,5.

1011,15.,0.,5.

1511,15.,15.,5.

1501,0.,15.,5.

1012,20.,0.,5.

1512,20.,15.,5.

1551,0.,20.,5.

1561,15.,20.,5.

1562,20.,20.,5.

2001,0.,0.,5.

2011,15.,0.,5.

2511,15.,15.,5.

2501,0.,15.,5.

```
12001,0.,0.,15.
12011,15.,0.,15.
12511,15.,15.,15.
12501,0.,15.,15.
13001,0.,0.,15.
13011,15.,0.,15.
13511,15.,15.,15.
13501,0.,15.,15.
13012,20.,0.,15.
13512,20.,15.,15.
13551,0.,20.,15.
13561,15.,20.,15.
13562,20.,20.,15.
14001,0.,0.,20.
14011,15.,0.,20.
14511,15.,15.,20.
14501,0.,15.,20.
14012,20.,0.,20.
14512,20.,15.,20.
14551,0.,20.,20.
14561,15.,20.,20.
14562,20.,20.,20.
**
*NGEN,                NSET=LEFT1
1,501,50
*NGEN,                NSET=RIGHT1
11,511,50
*NFILL,               NSET=BASE1
LEFT1,RIGHT1,10,1
*NGEN,                NSET=BASE1
```

```
12,512,50
*NGEN,                NSET=BASE1
551,561,1
*NGEN,                NSET=LEFT2
1001,1501,50
*NGEN,                NSET=RIGHT2
1011,1511,50
*NFILL,               NSET=BASE2
LEFT2,RIGHT2,10,1
*NGEN,                NSET=BASE2
1012,1512,50
*NGEN,                NSET=BASE2
1551,1561,1
*NGEN,                NSET=LEFT3
2001,2501,50
*NGEN,                NSET=RIGHT3
2011,2511,50
*NFILL,               NSET=BASE3
LEFT3,RIGHT3,10,1
*NGEN,                NSET=LEFT4
12001,12501,50
*NGEN,                NSET=RIGHT4
12011,12511,50
*NFILL,               NSET=BASE4
LEFT4,RIGHT4,10,1
*NFILL,               NSET=STEEL
BASE3,BASE4,10,1000
*NGEN,                NSET=LEFT5
13001,13501,50
*NGEN,                NSET=RIGHT5
```

```
13011,13511,50
*NFILL,              NSET=BASE5
LEFT5,RIGHT5,10,1
*NGEN,               NSET=BASE5
13012,13512,50
*NGEN,               NSET=BASE5
13551,13561,1
*NGEN,               NSET=LEFT6
14001,14501,50
*NGEN,               NSET=RIGHT6
14011,14511,50
*NFILL,              NSET=BASE6
LEFT6,RIGHT6,10,1
*NGEN,               NSET=BASE6
14012,14512,50
*NGEN,               NSET=BASE6
14551,14561,1
*NSET,               NSET=B12,    GENERATE
1001,14001,1000
*NSET,               NSET=B2,     GENERATE
1002,14002,1000
1003,14003,1000
1004,14004,1000
1005,14005,1000
1006,14006,1000
1007,14007,1000
1008,14008,1000
1009,14009,1000
1010,14010,1000
1011,14011,1000
```

```
*NSET,              NSET=B1,     GENERATE
1051,14051,1000
1101,14101,1000
1151,14151,1000
1201,14201,1000
1251,14251,1000
1301,14301,1000
1351,14351,1000
1401,14401,1000
1451,14451,1000
1501,14501,1000
**
*ELEMENT,           TYPE=C3D8,          ELSET=STEEL1
1, 1,2,52,51,1001,1002,1052,1051
*ELGEN,             ELSET=STEEL1
1,11,1,1,11,50,20
*ELEMENT,           TYPE=C3D8RH,        ELSET=RUBBER
1001,2001,2002,2052,2051,3001,3002,3052,3051
*ELGEN,             ELSET=RUBBER
1001,10,1,1,10,50,20,10,1000,1000
*ELEMENT,           TYPE=C3D8,          ELSET=STEEL2
12001,13001,13002,13052,13051,14001,14002,14052,14051
*ELGEN,             ELSET=STEEL2
12001,11,1,1,11,50,20
**ELEMENT
*ELSET,             ELSET=RU1,          GENERATE
1001,1010,1
1021,1030,1
1041,1050,1
1061,1070,1
```

1081,1090,1

1101,1110,1

1121,1130,1

1141,1150,1

1161,1170,1

1181,1190,1

*ELSET, ELSET=RU2, GENERATE

10001,10010,1

10021,10030,1

10041,10050,1

10061,10070,1

10081,10090,1

10101,10110,1

10121,10130,1

10141,10150,1

10161,10170,1

10181,10190,1

*ELSET, ELSET=TOP, GENERATE

12001,12181,20

12002,12182,20

12003,12183,20

12004,12184,20

12005,12185,20

12006,12186,20

12007,12187,20

12008,12188,20

12009,12189,20

12010,12190,20

*ELSET, ELSET=RB4, GENERATE

1010,1190,20

```
*ELSET,                ELSET=RB5,          GENERATE
1181,1190,1
*ELSET,                ELSET=RT4,          GENERATE
10010,10190,20
*ELSET,                ELSET=RT5,          GENERATE
10181,10190,1
*ELEMENT,              TYPE=SPRING2,       ELSET=CX
40001,1001,2001
45001,12001,13001
*ELGEN,                ELSET=CX
40001,2,10,10,2,500,500
45001,2,10,10,2,500,500
*SPRING,               ELSET=CX
1,1
14.63
*ELEMENT,              TYPE=SPRING2,       ELSET=CY
20001,1001,2001
25001,12001,13001
*ELGEN,                ELSET=CY
20001,2,10,10,2,500,500
25001,2,10,10,2,500,500
*SPRING,               ELSET=CY
2,2
14.63
*ELEMENT,              TYPE=SPRING2,       ELSET=CZ
30001,1001,2001
35001,12001,13001
*ELGEN,                ELSET=CZ
30001,2,10,10,2,500,500
35001,2,10,10,2,500,500
```

```
*SPRING,            ELSET=CZ
3,3
32.63
*ELEMENT,           TYPE=SPRING2        ,ELSET=SX
40002,1002,2002
40051,1051,2051
45002,12002,13002
45051,12051,13051
*ELGEN,                 ELSET=SX
40002,9,1,1,2,500,500
40051,2,10,10,9,50,50
45002,9,1,1,2,500,500
45051,2,10,10,9,50,50
*SPRING,                ELSET=SX
1,1
29.25
*ELEMENT,               TYPE=SPRING2,       ELSET=SY
20002,1002,2002
20051,1051,2051
25002,12002,13002
25051,12051,13051
*ELGEN,                 ELSET=SY
20002,9,1,1,2,500,500
20051,2,10,10,9,50,50
25002,9,1,1,2,500,500
25051,2,10,10,9,50,50
*SPRING,                ELSET=SY
2,2
29.25
*ELEMENT,               TYPE=SPRING2,       ELSET=SZ
```

```
30002,1002,2002
30051,1051,2051
35002,12002,13002
35051,12051,13051
*ELGEN,                 ELSET=SZ
30002,9,1,1,2,500,500
30051,2,10,10,9,50,50
35002,9,1,1,2,500,500
35051,2,10,10,9,50,50
*SPRING,                ELSET=SZ
3,3
65.25
*ELEMENT,               TYPE=SPRING2,    ELSET=MX
40052,1052,2052
45052,12052,13052
*ELGEN,ELSET=MX
40052,9,1,1,9,50,50
45052,9,1,1,9,50,50
*SPRING,ELSET=MX
1,1
58.50
**
*ELEMENT,               TYPE=SPRING2,    ELSET=MY
20052,1052,2052
25052,12052,13052
*ELGEN,                 ELSET=MY
20052,9,1,1,9,50,50
25052,9,1,1,9,50,50
*SPRING,                ELSET=MY
2,2
```

```
58.50
**
*ELEMENT,                TYPE=SPRING2,     ELSET=MZ
30052,1052,2052
35052,12052,13052
*ELGEN,                  ELSET=MZ
30052,9,1,1,9,50,50
35052,9,1,1,9,50,50
*SPRING,                 ELSET=MZ
3,3
130.50
*ELSET,                  ELSET=T1,    GENERATE
10001,10010,1
10101,10110,1
10181,10190,1
*SOLID SECTION,    ELSET=STEEL1,     MATERIAL=STEEL
*SOLID SECTION,    ELSET=RUBBER,     MATERIAL=RUBBER
*SOLID SECTION,    ELSET=STEEL2,     MATERIAL=STEEL
*MATERIAL,         NAME=RUBBER
*HYPERELASTIC,N=2
2.843,-1.986,2.013,-1.311,0.318
*MATERIAL,         NAME=STEEL
*ELASTIC
200E3,0.3
*SURFACE DEFINITION,     NAME=ST1
STEEL1,S2
*SURFACE DEFINITION,     NAME=RU1
RU1,S1
RB4,S4
RB5,S5
```

```
*SURFACE DEFINITION,        NAME=ST2
STEEL2,S1
*SURFACE DEFINITION,        NAME=RU2
RU2,S2
RT4,S4
RT5,S5
*CONTACT PAIR, INTERACTION=FRIC,SMALL SLIDING
RU1,ST1
RU2,ST2
*SURFACE INTERACTION,       NAME=FRIC
*FRICTION
0.0
**
*STEP,                      NLGEOM,       INC=20
*STATIC
*BOUNDARY
BASE1, ENCASTRE
B12, 1,2
B1,  1
B2,  2
BASE5,ZASYMM
BASE6,ZASYMM
*DLOAD
TOP,P2,1.0
*RESTART, WRITE
*NODE PRINT,NSET=BASE6
U
*EL PRINT,ELSET=RUBBER
S,MISES,PRESS
*END STEP
```

ตัวอย่างอินพุตไฟล์สำหรับชิ้นงานยางเส้นผ่าศูนย์กลาง 40 mm หนา 10 mm เชื่อมต่อแบบอิสระ (Free Bonding) รับแรงกด 1 MPa

```
*HEADING
Test element
SI unit mm
Circular Bonded Disk, h=10 mm, D=40 mm, Free Bonding
*NODE,                SYSTEM=C
1,0.,0.,0.
2,1.333,0.,0.
142,20.,0.,0.
152,25.,0.,0.
10,1.333,90.,0.
150,20.,90.,0.
160,25.,90.,0.
501,0.,0.,5.
502,1.333,0.,5.
642,20.,0.,5.
652,25.,0.,5.
510,1.333,90.,5.
650,20.,90.,5.
660,25.,90.,5.
1001,0.,0.,5.
1002,1.333,0.,5.
1142,20.,0.,5.
1010,1.333,90.,5.
1150,20.,90.,5.
7001,0.,0.,15.
7002,1.333,0.,15.
7142,20.,0.,15.
```

```
7010,1.333,90.,15.
7150,20.,90.,15.
7501,0.,0.,15.
7502,1.333,0.,15.
7642,20.,0.,15.
7652,25.,0.,15.
7510,1.333,90.,15.
7650,20.,90.,15.
7660,25.,90.,15.
8001,0.,0.,20.
8002,1.333,0.,20.
8142,20.,0.,20.
8152,25.,0.,20.
8010,1.333,90.,20.
8150,20.,90.,20.
8160,25.,90.,20.
*NGEN,LINE=C,                NSET=IN1
2,10,1, ,0,0,0,0,0,1.
*NGEN,LINE=C,                NSET=OUT1
142,150,1, ,0,0,0,0,0,1.
*NFILL,                      NSET=BASE1
IN1,OUT1,14,10
*NGEN,LINE=C,                NSET=BASE1
152,160,1, ,0,0,0,0,0,1.
*NGEN,LINE=C,                NSET=IN2
502,510,1, ,0,0,5,0,0,1.
*NGEN,LINE=C,                NSET=OUT2
642,650,1, ,0,0,5,0,0,1.
*NFILL,                      NSET=BASE2
IN2,OUT2,14,10
```

```
*NGEN,LINE=C,                NSET=BASE2
652,660,1, ,0,0,5,0,0,1.
*NGEN,LINE=C,                NSET=IN3
1002,1010,1, ,0,0,5,0,0,1.
*NGEN,LINE=C,                NSET=OUT3
1142,1150,1, ,0,0,5,0,0,1.
*NFILL,                      NSET=BASE3
IN3,OUT3,14,10
*NGEN,LINE=C,                NSET=IN4
7002,7010,1, ,0,0,15,0,0,1.
*NGEN,LINE=C,                NSET=OUT4
7142,7150,1, ,0,0,15,0,0,1.
*NFILL,                      NSET=BASE4
IN4,OUT4,14,10
*NFILL,                      NSET=RUBBER
BASE3,BASE4,12,500
*NGEN
1001,7001,500
*NGEN,LINE=C,                NSET=IN5
7502,7510,1, ,0,0,15,0,0,1.
*NGEN,LINE=C,                NSET=OUT5
7642,7650,1, ,0,0,15,0,0,1.
*NFILL,                      NSET=BASE5
IN5,OUT5,14,10
*NGEN,LINE=C,                NSET=BASE5
7652,7660,1, ,0,0,15,0,0,1.
*NGEN,LINE=C,                NSET=IN6
8002,8010,1, ,0,0,20,0,0,1.
*NGEN,LINE=C,                NSET=OUT6
8142,8150,1, ,0,0,20,0,0,1.
```

```
*NFILL,                    NSET=BASE6
IN6,OUT6,14,10
*NGEN,LINE=C,              NSET=BASE6
8152,8160,1, ,0,0,20,0,0,1.
*NSET,        NSET=B12,    GENERATE
1,8001,500
*NSET,        NSET=B2,     GENERATE
502,8002,500
512,8012,500
522,8022,500
532,8032,500
542,8042,500
552,8052,500
562,8062,500
572,8072,500
582,8082,500
592,8092,500
602,8102,500
612,8112,500
622,8122,500
632,8132,500
642,8142,500
*NSET,        NSET=B1,     GENERATE
510,8010,500
520,8020,500
530,8030,500
540,8040,500
550,8050,500
560,8060,500
570,8070,500
```

```
580,8080,500
590,8090,500
600,8100,500
610,8110,500
620,8120,500
630,8130,500
640,8140,500
650,8150,500
*NSET,                NSET=TOT
BASE1,BASE2,BASE5,BASE6,RUBBER,B12
**Create triangular element
*ELEMENT,   TYPE=C3D6H, ELSET=STEEL1
1,1,2,3,501,502,503
2,1,3,4,501,503,504
3,1,4,5,501,504,505
4,1,5,6,501,505,506
5,1,6,7,501,506,507
6,1,7,8,501,507,508
7,1,8,9,501,508,509
8,1,9,10,501,509,510
*ELEMENT,   TYPE=C3D8RH,      ELSET=STEEL1
11,2,12,13,3,502,512,513,503
*ELGEN,                       ELSET=STEEL1
11,8,1,1,15,10,10
*ELEMENT,   TYPE=C3D6H,       ELSET=RUBBER
1001,1001,1002,1003,1501,1502,1503
1002,1001,1003,1004,1501,1503,1504
1003,1001,1004,1005,1501,1504,1505
1004,1001,1005,1006,1501,1505,1506
1005,1001,1006,1007,1501,1506,1507
```

```
1006,1001,1007,1008,1501,1507,1508
1007,1001,1008,1009,1501,1508,1509
1008,1001,1009,1010,1501,1509,1510
*ELGEN,ELSET=RUBBER
1001,12,500,1000
1002,12,500,1000
1003,12,500,1000
1004,12,500,1000
1005,12,500,1000
1006,12,500,1000
1007,12,500,1000
1008,12,500,1000
*ELEMENT,  TYPE=C3D8RH,  ELSET=RUBBER
1011,1002,1012,1013,1003,1502,1512,1513,1503
*ELGEN,  ELSET=RUBBER
1011,8,1,1,14,10,10,12,500,1000
*ELEMENT,  TYPE=C3D6H,  ELSET=STEEL2
13001,7501,7502,7503,8001,8002,8003
13002,7501,7503,7504,8001,8003,8004
13003,7501,7504,7505,8001,8004,8005
13004,7501,7505,7506,8001,8005,8006
13005,7501,7506,7507,8001,8006,8007
13006,7501,7507,7508,8001,8007,8008
13007,7501,7508,7509,8001,8008,8009
13008,7501,7509,7510,8001,8009,8010
*ELEMENT,  TYPE=C3D8RH,  ELSET=STEEL2
13011,7502,7512,7513,7503,8002,8012,8013,8003
*ELGEN,  ELSET=STEEL2
13011,8,1,1,15,10,10
**ELEMENT
```

```
*ELSET,     ELSET=RU1,          GENERATE
1001,1141,10
1002,1142,10
1003,1143,10
1004,1144,10
1005,1145,10
1006,1146,10
1007,1147,10
1008,1148,10
*ELSET,             ELSET=RU2,  GENERATE
12001,12141,10
12002,12142,10
12003,12143,10
12004,12144,10
12005,12145,10
12006,12146,10
12007,12147,10
12008,12148,10
*ELSET,             ELSET=TOP,  GENERATE
13001,13141,10
13002,13142,10
13003,13143,10
13004,13144,10
13005,13145,10
13006,13146,10
13007,13147,10
13008,13148,10
*ELSET,             ELSET=RB,   GENERATE
1141,1148,1
2141,2148,1
```

```
*ELSET,                ELSET=RT,     GENERATE
12141,12148,1
12141,12148,1
*ELSET,                ELSET=SIDE,   GENERATE
1001,1141,10
2001,2141,10
3001,3141,10
4001,4141,10
5001,5141,10
6001,6141,10
7001,7141,10
8001,8141,10
9001,9141,10
10001,10141,10
11001,11141,10
12001,12141,10
**
*SOLID SECTION, ELSET=STEEL1,MATERIAL=STEEL,
ORIENTATION=LOCALC
*SOLID SECTION, ELSET=RUBBER,MATERIAL=RUBBER,
ORIENTATION=LOCALC
*SOLID SECTION, ELSET=STEEL2,MATERIAL=STEEL,
ORIENTATION=LOCALC
*ORIENTATION, NAME=LOCALC,SYSTEM=CYLINDRICAL
0.,0.,0.,0.,0.,1.
1,0.
*MATERIAL,                NAME=RUBBER
*HYPERELASTIC,N=2
2.843,-1.986,2.013,-1.311,0.318
*MATERIAL,                NAME=STEEL
```

```
*ELASTIC
200.E4, 0.3
*SURFACE DEFINITION, NAME=ST1
STEEL1,S2
*SURFACE DEFINITION,      NAME=RU1
RU1,S1
RB,S4
*SURFACE DEFINITION,      NAME=ST2
STEEL2,S1
*SURFACE DEFINITION,      NAME=RU2
RU2,S2
RT,S4
*CONTACT PAIR, INTERACTION=FRIC,SMALL SLIDING
RU1,ST1
RU2,ST2
*SURFACE INTERACTION, NAME=FRIC
*FRICTION
0.0
**********Local Cooordinate syatem**********
*TRANSFORM,          NSET=TOT,    TYPE=C
0.,0.,0.,0.,0.,1.
*STEP,NLGEOM
*STATIC
*BOUNDARY
BASE1, ENCASTRE
1, ENCASTRE
B12,1,2
B2,2
B1,2
BASE5,ZASYMM
```

```
BASE6,ZASYMM
*DLOAD
TOP,P2,1.0
*RESTART, WRITE
*NODE PRINT,NSET=BASE6
U
*EL PRINT,ELSET=SIDE
S,MISES,PRESS
*END STEP
```