Tutorial 41: Inserting Blades, Cuts and Joints into Solid Geometries

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Contents

FUNCTION NOT BUGF FEREE

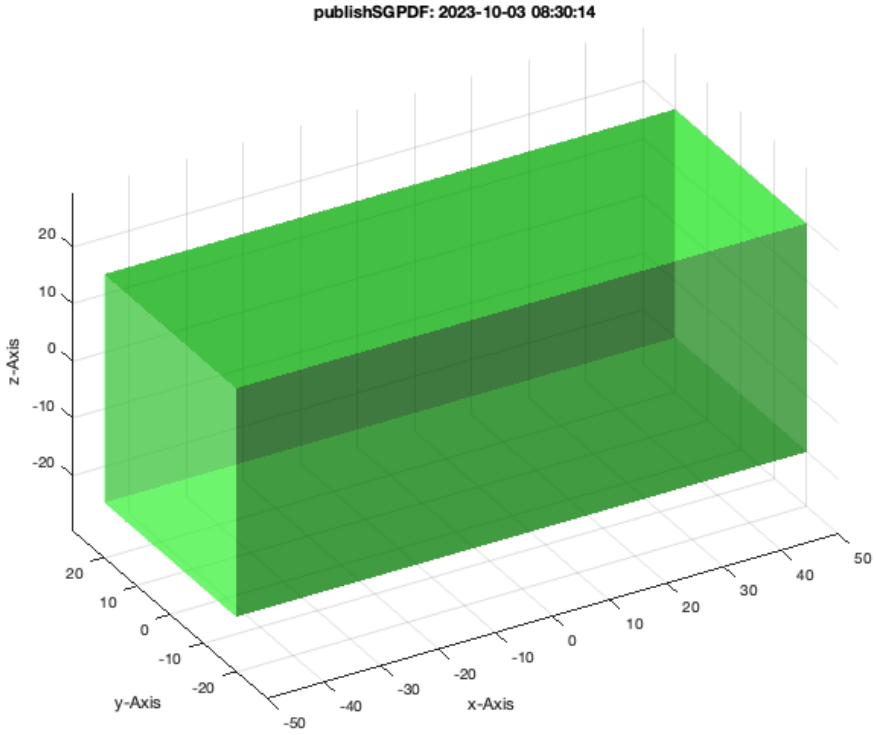
```
% function VLFL_EXP41
% clear all; close all;
```

Create a simple bar type link

```
A=SGbox([100,40,40])
SGfigure; h=SGplot(A); view(-30,30); setplotlight(h,'g',0.5);
```

```
A =
  struct with fields:

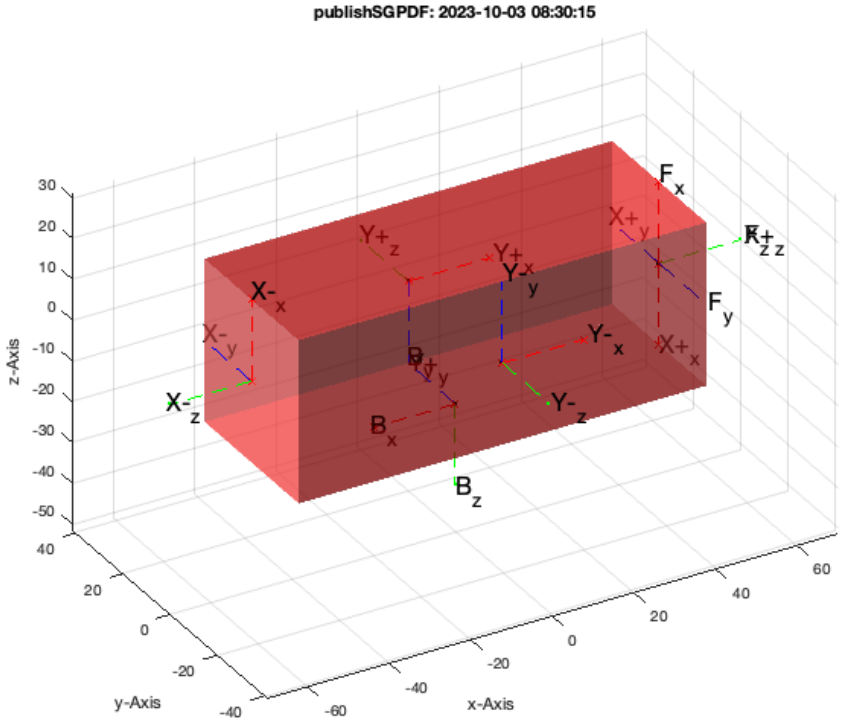
      VL: [8×3 double]
      FL: [12×3 double]
   Tname: {'B'  'F'  'X+'  'X-'  'Y+'  'Y-'}
       T: {1×6 cell}
    TFiL: {[]  []  []  []  []  []}
```



Create a Folloer Frame at the x-Side of the solid

```
A=SGTset(A,'F',TofFS(A,[1 0 0]));

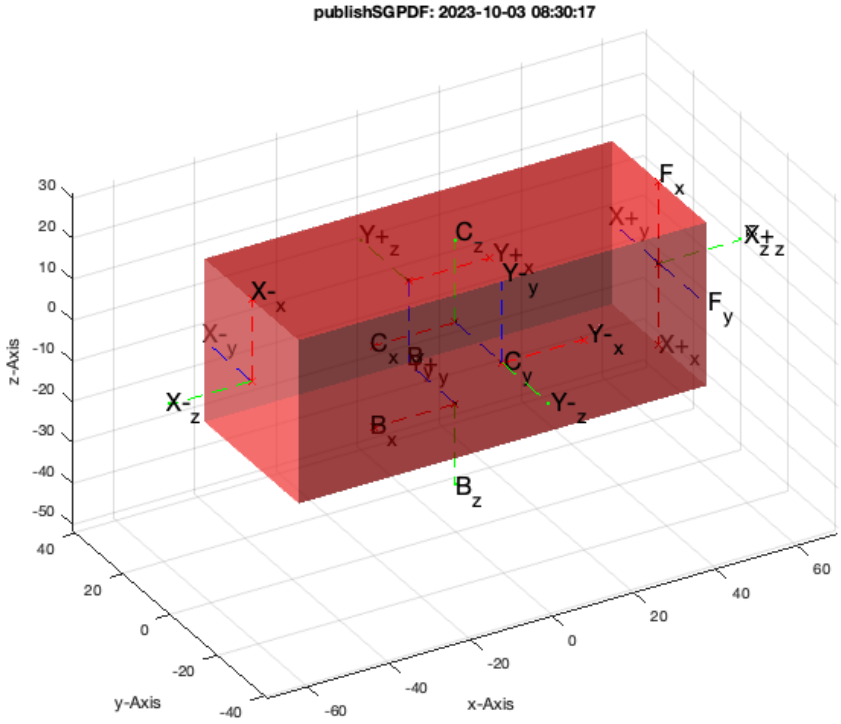
SGfigure; h=SGplot(A); SGTframeplot(A);   view(-30,30); setplotlight(h,'r',0.5);
```



Create a cutting frame in the middle

```
A=SGTset(A,'C',TofT(SGTget(A,'F'),rot(0,+pi/2,0),[0 0 -50]));

SGfigure; h=SGplot(A); SGTframeplot(A);   view(-30,30); setplotlight(h,'r',0.5);
```

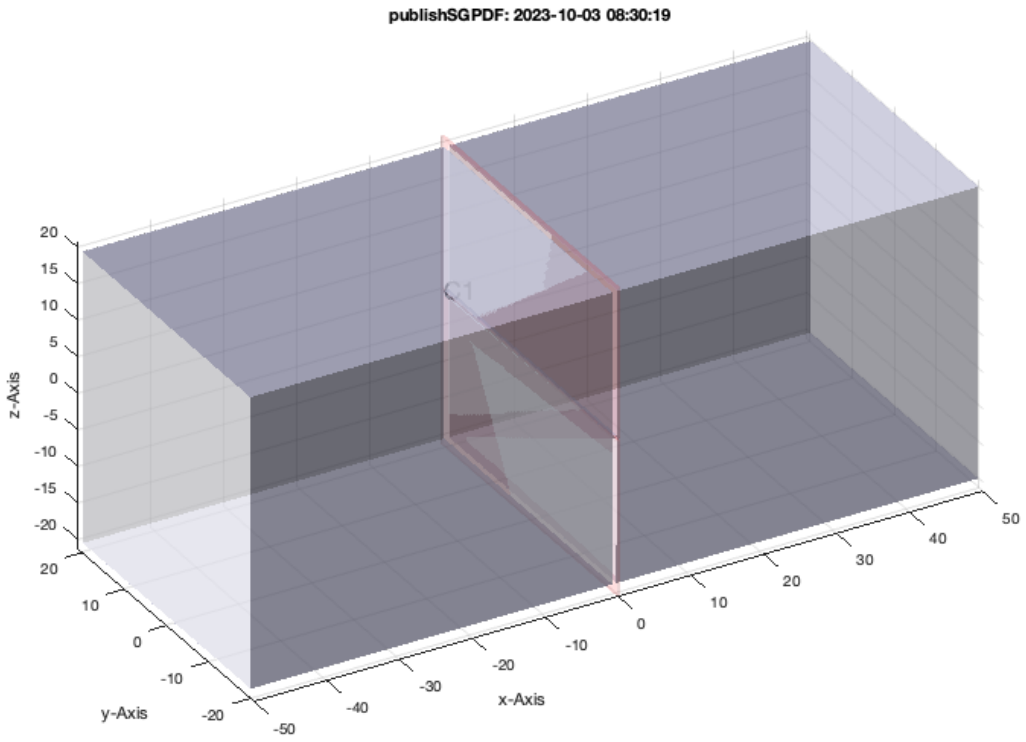


Show a default cut at the cutting frame

```
TC=SGTget(A,'C')
SGinsertCut(A,TC)
```

```
TC =
   -1.0000         0         0         0
         0   -1.0000         0         0
         0         0    1.0000   -0.0000
         0         0         0    1.0000
PL =
         0   21.0000
         0  -20.0000
         0  -21.0000
         0   -0.0000
ans =
  struct with fields:

    VL: [31×3 double]
    FL: [58×3 double]
```

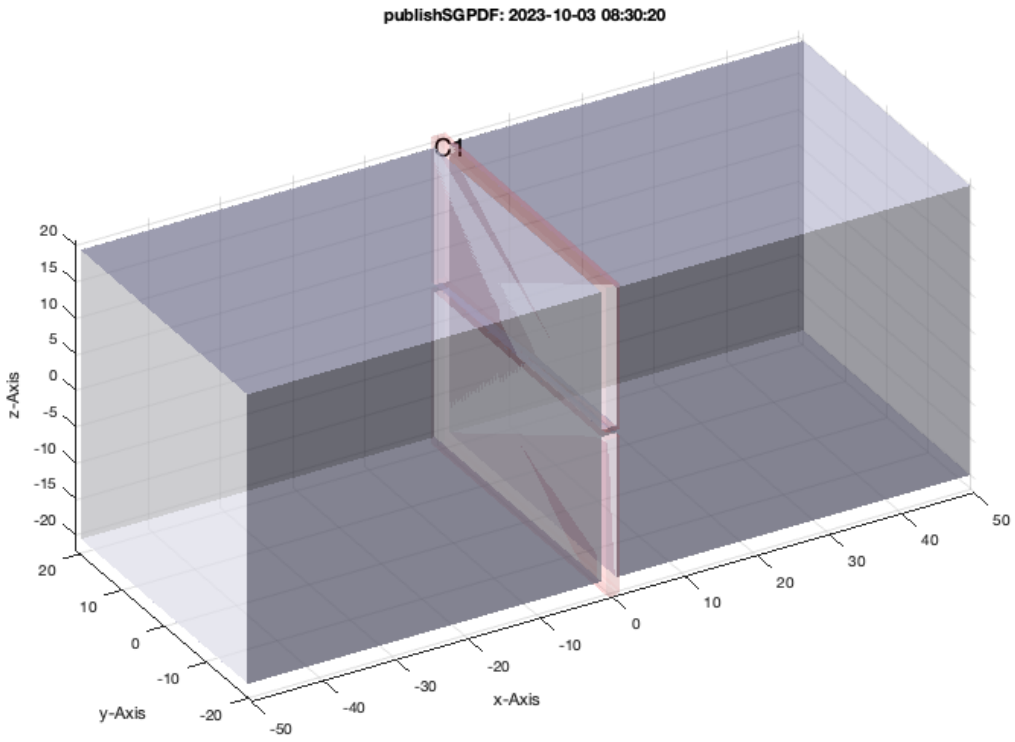


Show a 1mm cut at the cutting frame

```
SGinsertCut(A,TC,1)
```

```
PL =
         0   21.0000
         0  -20.0000
         0  -21.0000
         0   -0.0000
ans =
  struct with fields:

    VL: [44×3 double]
    FL: [84×3 double]
```

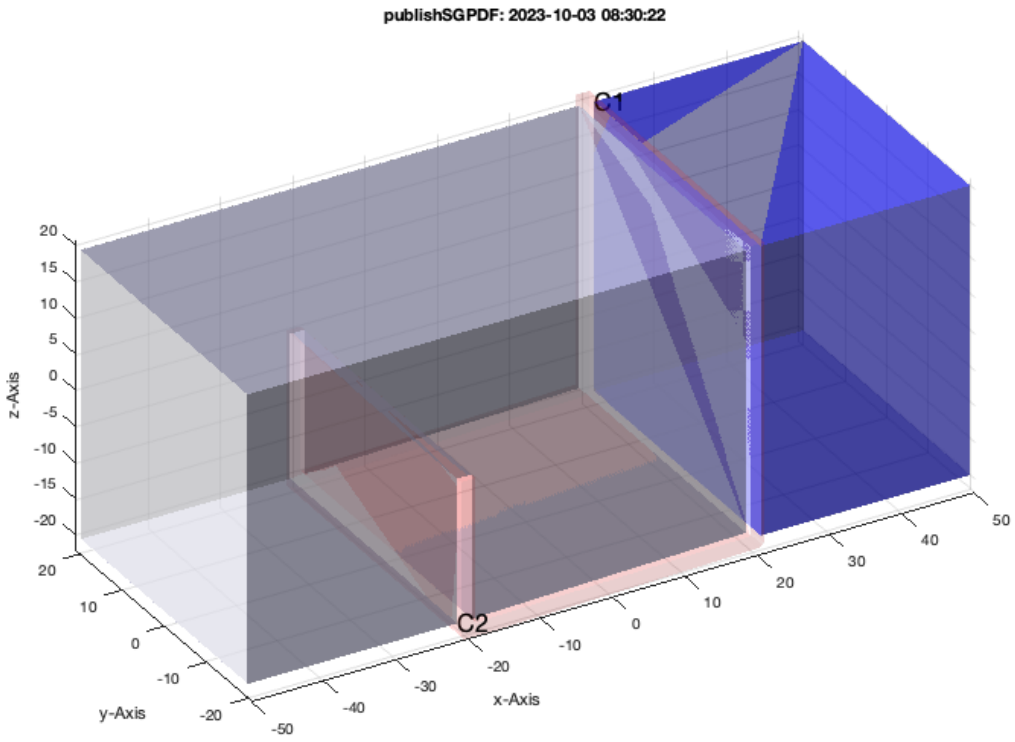


Show a z-cut 1mm by 40 mm at the cutting frame

```
SGinsertCut(A,TC,1,40)
```

```
PL =
  -20.0000   21.0000
  -20.0000  -20.0000
   20.0000  -21.0000
   20.0000   -0.0000
ans =
  struct with fields:

    VL: [50×3 double]
    FL: [87×3 double]
```

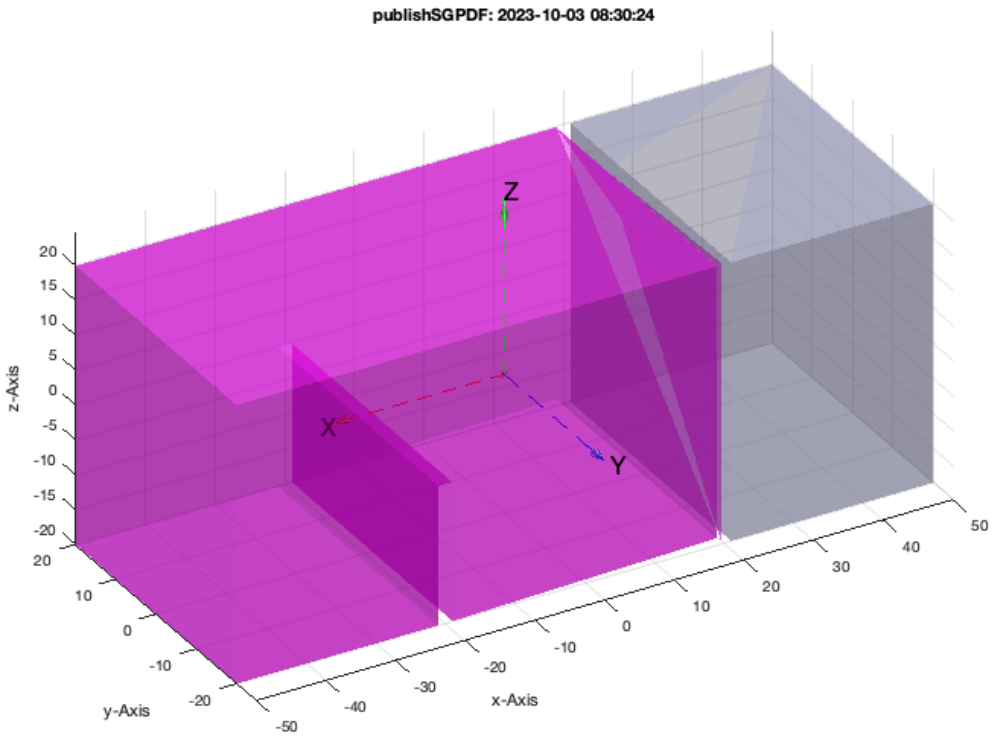


Analyze the cut and detec two separted solids

```
B=SGinsertCut(A,TC,1,40);
SGseparatebyT(B,TC)
```

```
PL =
  -20.0000   21.0000
  -20.0000  -20.0000
   20.0000  -21.0000
   20.0000   -0.0000
d =
   31.0000   20.0000
d =
   82.0000   19.4997
ans =
  struct with fields:

    VL: [36×3 double]
    FL: [64×3 double]
```



Separate the solids into different solids

```
[NX,NA,NB,NC]=SGseparatebyT(B,TC)
```

```
d =
   31.0000   20.0000
d =
   82.0000   19.4997
NX =
  struct with fields:

    VL: [36×3 double]
    FL: [64×3 double]
NA =
  struct with fields:
```

```
    VL: [0×3 double]
    FL: [0×3 double]
NB =
  struct with fields:

    VL: [0×3 double]
    FL: [0×3 double]
NC =
  struct with fields:

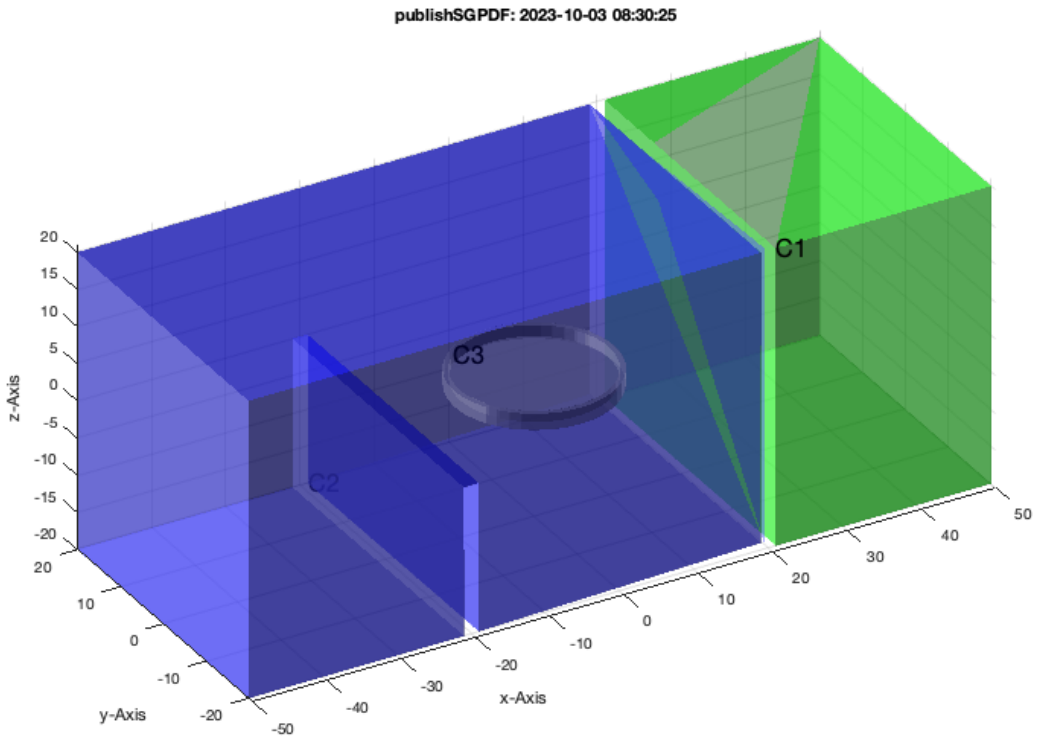
    VL: [14×3 double]
    FL: [23×3 double]
```

Combined Function Simplified Peg in Hole using the same parameter as the cut

```
SGinsertPeghole(B,TC,1,40)
```

```
ans =
  struct with fields:

    VL: [342×3 double]
    FL: [667×3 double]
```

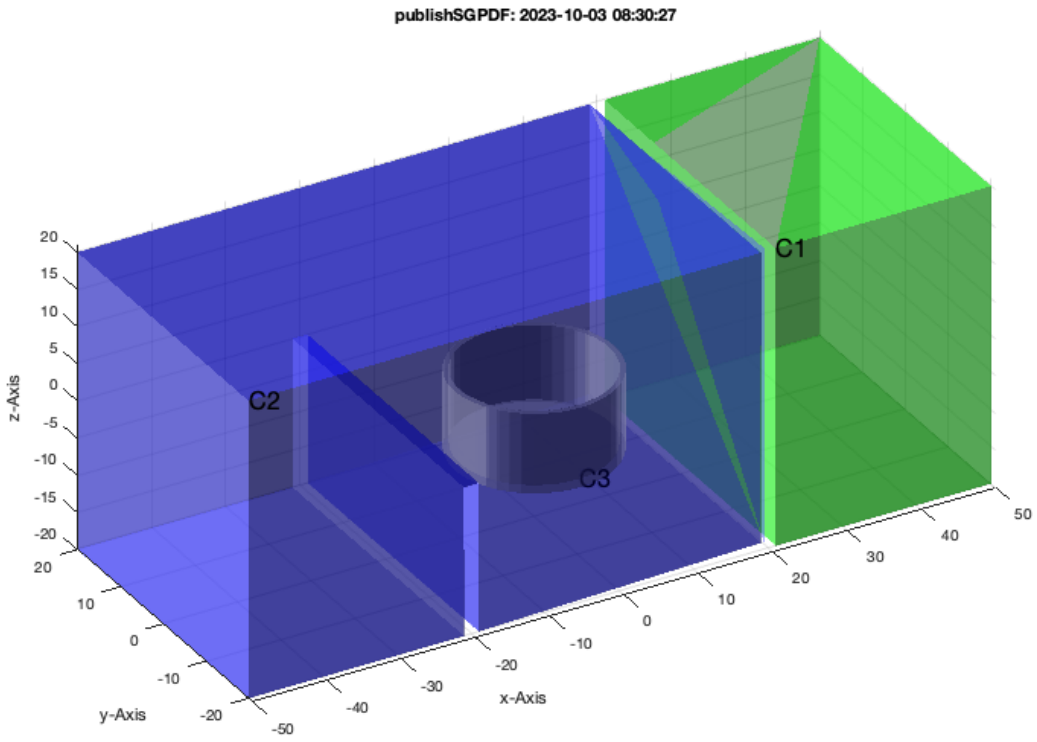


Simplified Peg in Hole using a longer peg

```
SGinsertPeghole(B,TC,1,40,20)
```

```
ans =
  struct with fields:

    VL: [342×3 double]
    FL: [667×3 double]
```



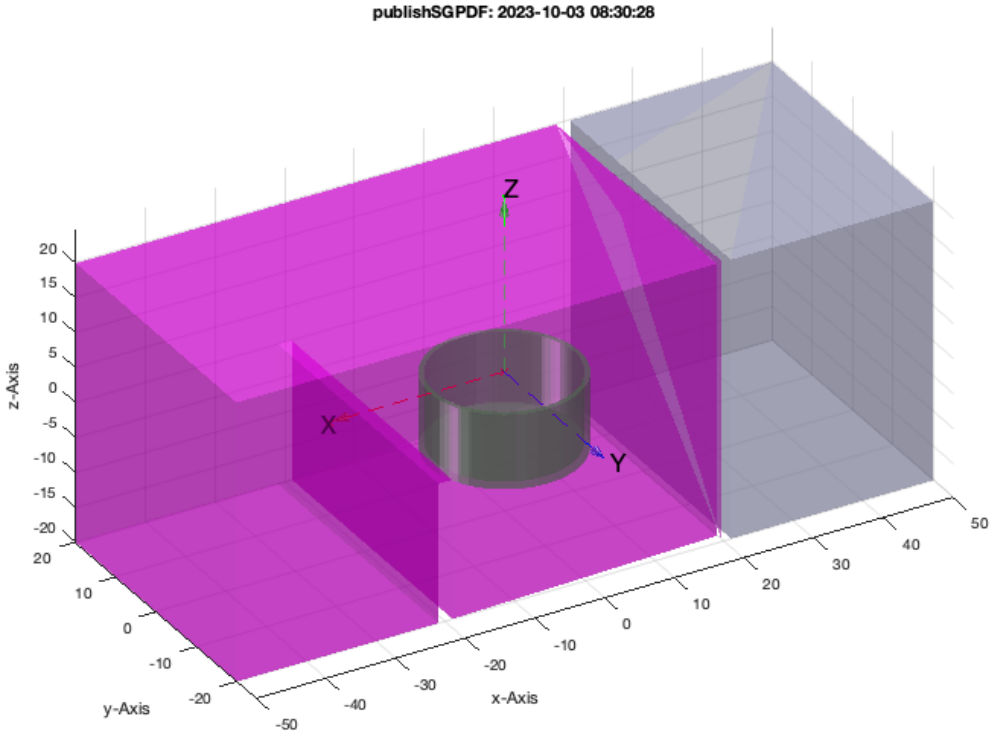
Now separate the parts

```
C=SGinsertPeghole(B,TC,1,40,20)
SGseparatebyT(C,TC)
```

```
C =
  struct with fields:

    VL: [342×3 double]
    FL: [667×3 double]
d =
   31.0000   20.0000
d =
  469.0000   10.0000
   89.0000   10.6917
   82.0000   19.4997
ans =
  struct with fields:

    VL: [36×3 double]
    FL: [64×3 double]
```



now start to adjust the size to the required movements

```
[X,Y]=SGseparatebyT(C,TC)

% SGboolTL(Y,'-',SGtransrelT(SGgrow(X,0.2),TC,TofR(rot(0,0,1*pi/10)))); Y=SGdelaunay(ans);
% SGboolTL(Y,'-',SGtransrelT(SGgrow(X,0.2),TC,TofR(rot(0,0,2*pi/10)))); Y=ans;
% SGboolTL(Y,'-',SGtransrelT(SGgrow(X,0.2),TC,TofR(rot(0,0,3*pi/10)))); Y=ans;
```

```
d =
   31.0000   20.0000
d =
  469.0000   10.0000
   89.0000   10.6917
   82.0000   19.4997
X =
  struct with fields:

    VL: [36×3 double]
    FL: [64×3 double]
Y =
  struct with fields:

    VL: [292×3 double]
    FL: [580×3 double]
```

wlim=[0 +pi/4] CVLofSGcutTrot(NB,TC,wlim,1); [~,~,~,~,XA,XB]=CVLofSGcutTrot(NB,TC,wlim,1);

%% SGboolTL(Y,'-',XA)

%% SGboolTL(Y,'-',XB)

Final Remarks

```
close all
VLFLlicense
```

```
This VLFL-Lib, Rel.  (2023-Oct-03), is for limited non commercial educational use only!
Licensee: Tim Lueth (Development Version)!
Please contact Tim Lueth, Professor at TU Munich, Germany!
```

```
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