

Input File for a Model of a Wheel Using Brick, Shell and Beam Elements

```
c
c Wheel - tire, felly, spokes and wheel-nave
c
parameter
  eps 4
  rad1 300          c wheel nave to tire
  rad2 25           c radius of tire
  rad5 [%rad1-%rad2]
  sig [%rad2*3/(4*sqrt(2))]
  rad4 [%rad5*cos(80)]      c outer radius of wheel nave
  rad3 20           c inner radius of wheel nave
  rad6 10
  wnl 40           c half length of wheel nave
  rad7 [%wnl*(%rad5-%rad3)/(%rad5-%rad4)];

c PART 1 - Felly
cylinder -1;1 289;1 9;
  [%rad1-%sig-%eps] 0 360 [-%sig] %sig
mate 1 thic 1
sfi -1;;;ts 0 0 0 0 1 [%rad1-%eps] 0 %rad2
endpart

c PART 2 - Tire
cylinder 1 2 6 7; 1 145; 1 2 6 7;
  [%rad1-%sig] [%rad1-%sig] [%rad1+%sig] [%rad1+%sig]
  0 360 [-%sig] [-%sig] %sig %sig
mate 2
dei 1 2 0 3 4;;1 2 0 3 4;
sfi -1 -4;;-1 -4;ts 0 0 0 0 1 %rad1 0 %rad2
endpart

c PART 3 - Wheel nave
cylinder 1 3; 1 37; 1 3;
  %rad6 %rad3 0 360 [-%rad7] %rad7
mate 3
endpart

c Start of global replication
gct 1 rxy rz 10; lev 1 grep 0 1;; pslv 1

c PART 4 - Spoke plates
cylinder 1 6; 1 37; -1; %rad3 %rad4 0 360 %wnl
```

```
pb 1 0 0 1 0 0 z %rad7  
mate 3  
endpart
```

```
c PART 5 - Spokes
```

```
beam  
cy [%rad5*.5] 10 [%wnl*.5];  
cy %rad4 100 %wnl;  
cy %rad5 20 0;  
cy %rad4 -80 %wnl;  
cy %rad5 0 0;  
bm 2 3 3 4 1 1 ;  
bm 4 5 3 4 1 1;  
lct 8 rz 40;repe 8; lrep 0 1 2 3 4 5 6 7 8;  
endpart
```

```
c End of global replication
```

```
pplv
```

```
merge
```