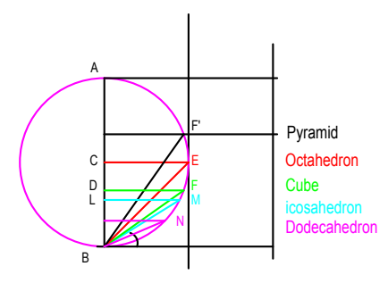
Change of energy without reversal (resonance)

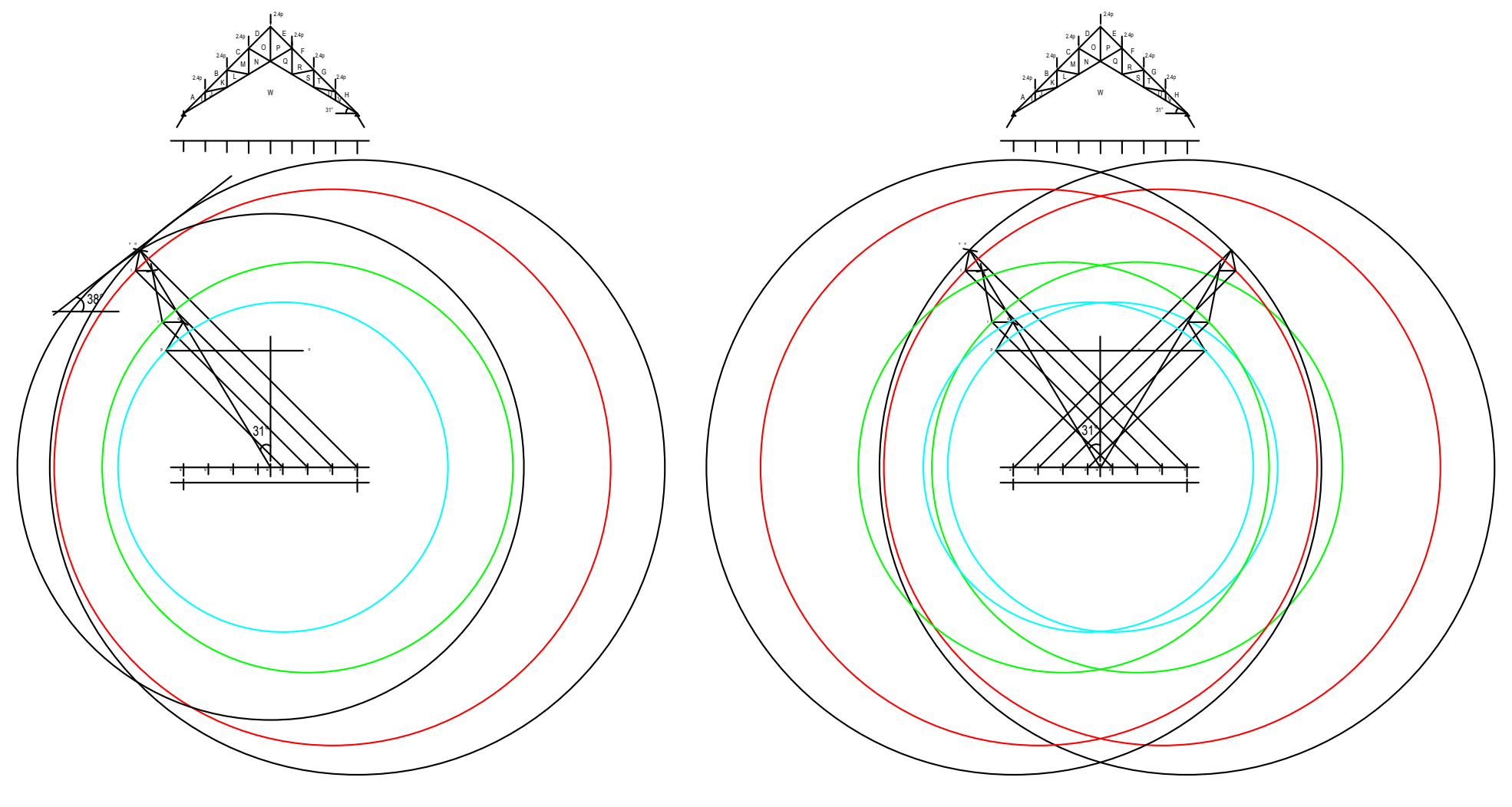
In order of increasing energy and angle
AF = pyramid n = 55°
BE = octahedron n = 45°
BF = cube n = 35°
MB = Icosahedron n = 31.8°
NB = dodecahedron n = 23.1°



We want dy/dx to equal tan 45 = 1
we have given to us dx = 1 /2 P or 1 /2 the span
dy = r2 - r1 cos θ
r2 - r1 cos θ /dx = 1
r1 cos θ = r2 - dx , cos θ = r2 -dx / r1 ,
θ = arc cos (r2 - dx / r1)
= arc cos (170 - 140 / 48) = arc cos 0.625 = 51°

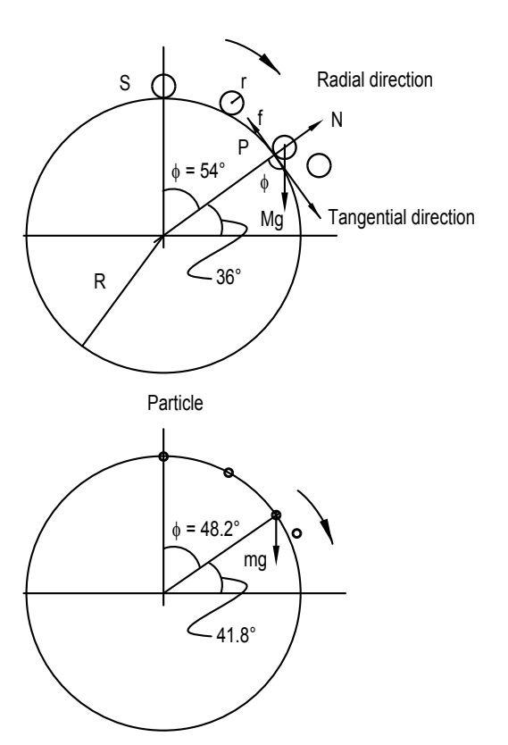
The scissors truss is already passed the bifurcation point and buckled, thus there is no need to increase the number of polygons

Take the pratt truss and assume as the bottom chord buckles it forms the scissors truss. The scissors truss is already passed the bifurcation point and buckled.
Varry the angle of the bottom chord and at 42 degrees the two rings become one.
So then, if we reverse the situation, backwards from 42 degrees when the bottom chord is lowered one ring becomes two and eventually the truss ans the load diagram closes to give us the particle energies as we know them, with a factor of roughly 100 fold.



Velocity Pole curve of the scissors truss

The two wave fronts merge into one

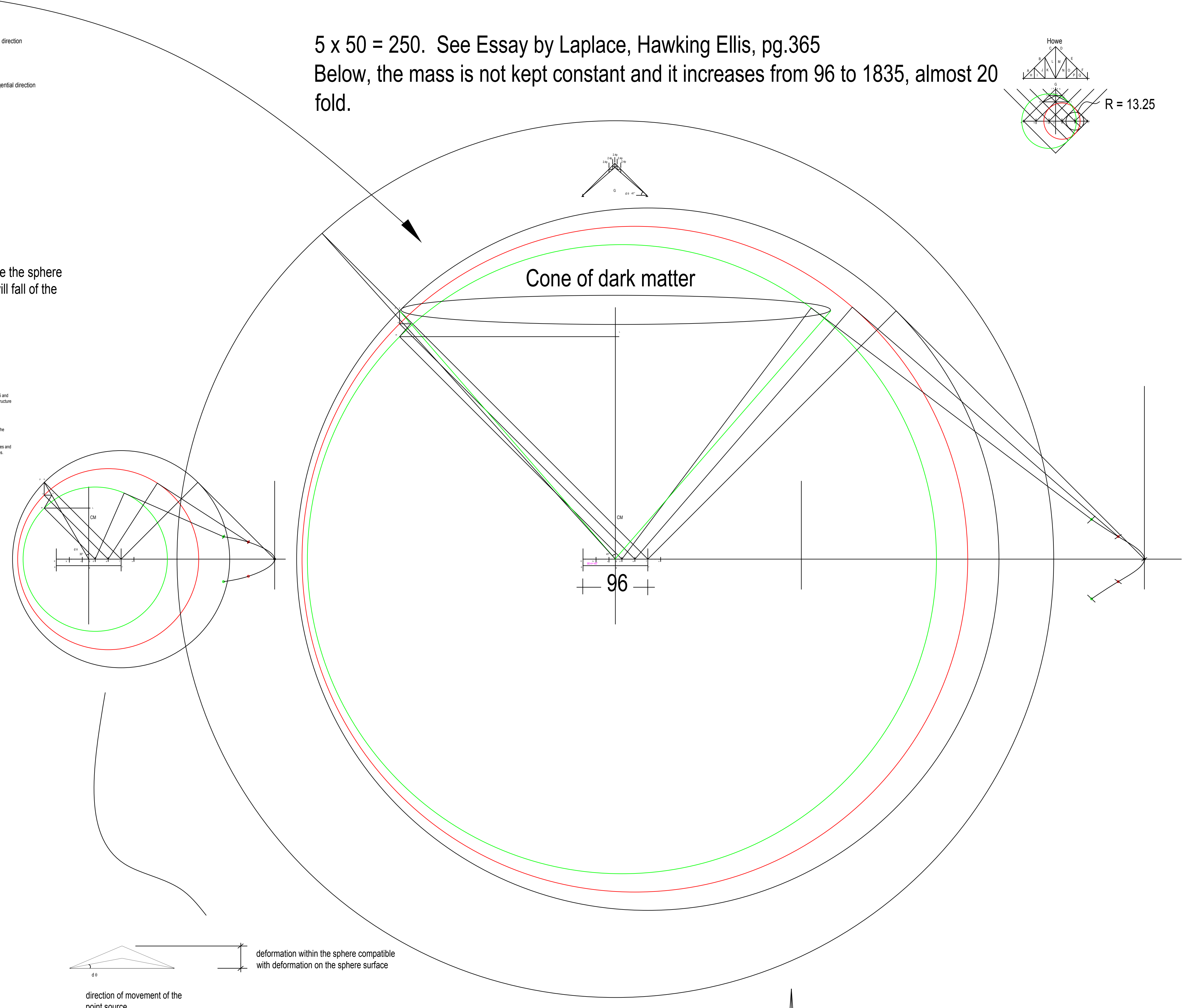


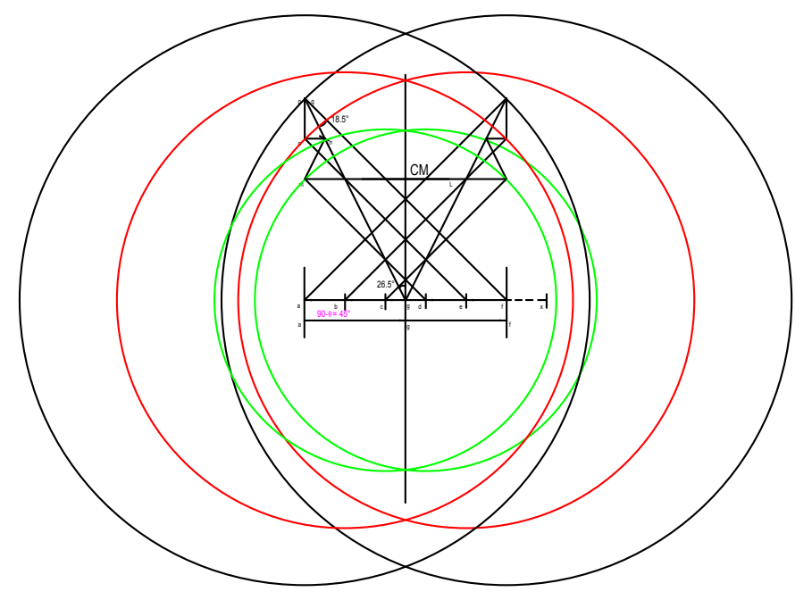
at 41.8° the particel will leave the sphere
at 35° a spere, with mass, will fall of the sphere

R = 520 . At 42° we should get a 100 fold increase. This is the point at which the tornado will form touch ground. Shown below in plan and elevation. 520 / 13.25 ≈ 39.24
At 42 R = 650 , 650 / 13.25 = 49 ≈ 50
But we have the truss above and below for the same span so if we count two trusses, then for the same load, the mass should be devided by 2. Hence we have to multiply 50 x 2, for a 100 fold increase.

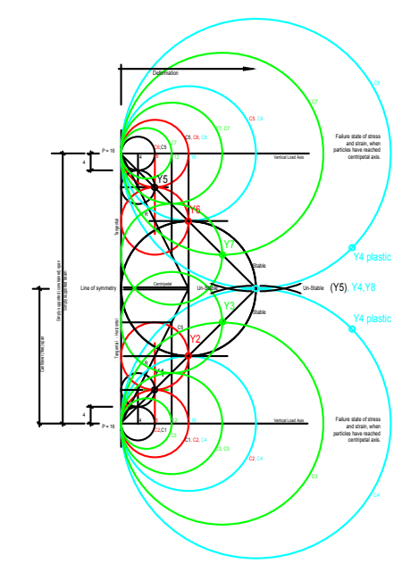
Assuming as with the 26° angle where the total mass is increased by 5 fold and is kept constant, and we take only the upper truss, then:

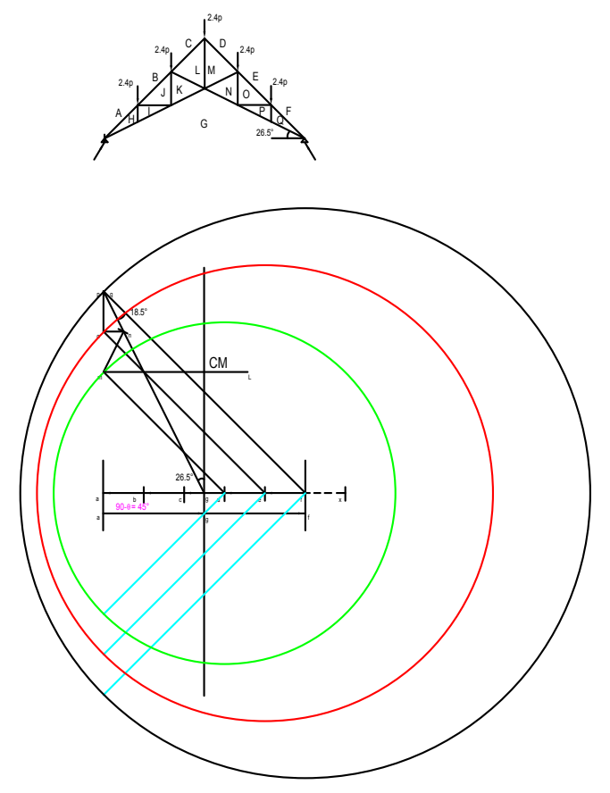
5 x 50 = 250. See Essay by Laplace, Hawking Ellis, pg.365
Below, the mass is not kept constant and it increases from 96 to 1835, almost 20 fold.

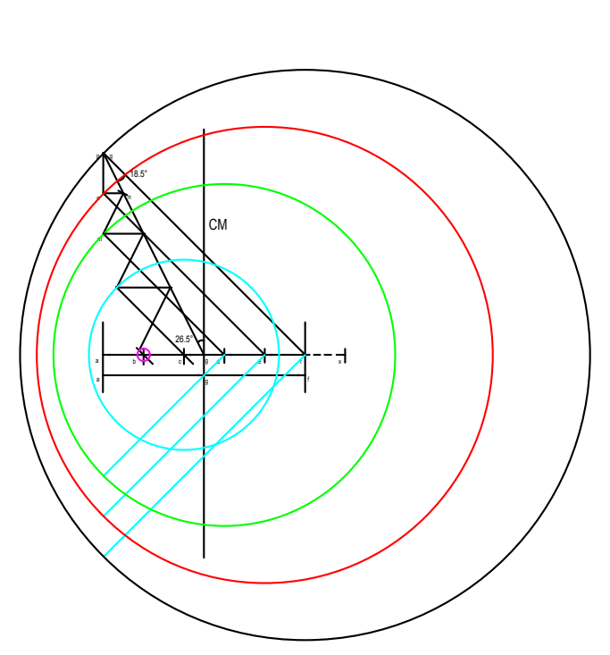


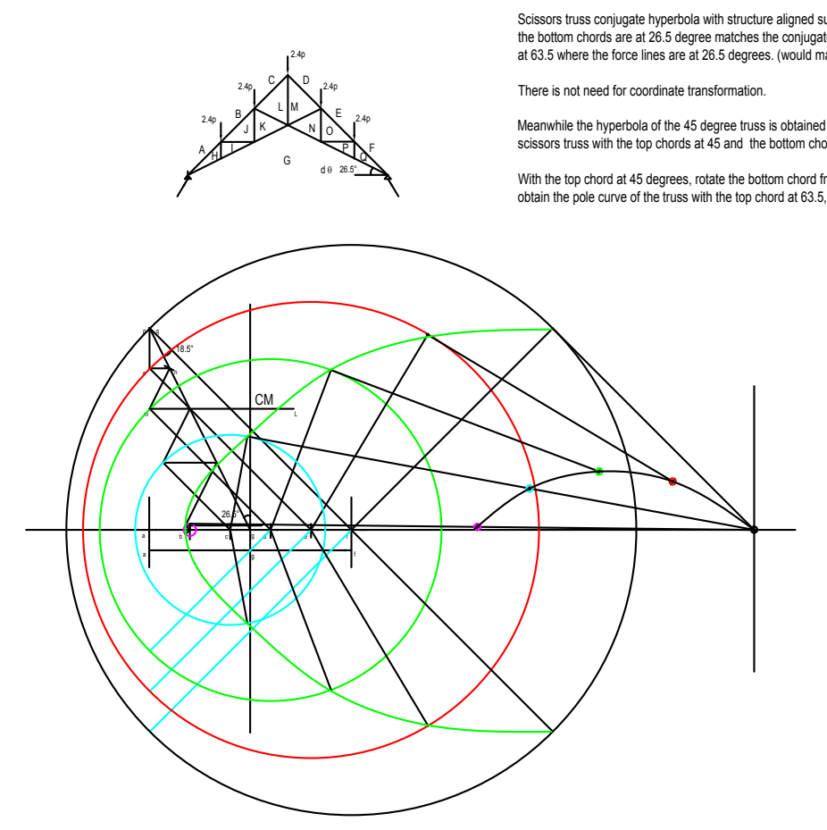


Associate with oval of the second kind as the circles are taken from opposite sides







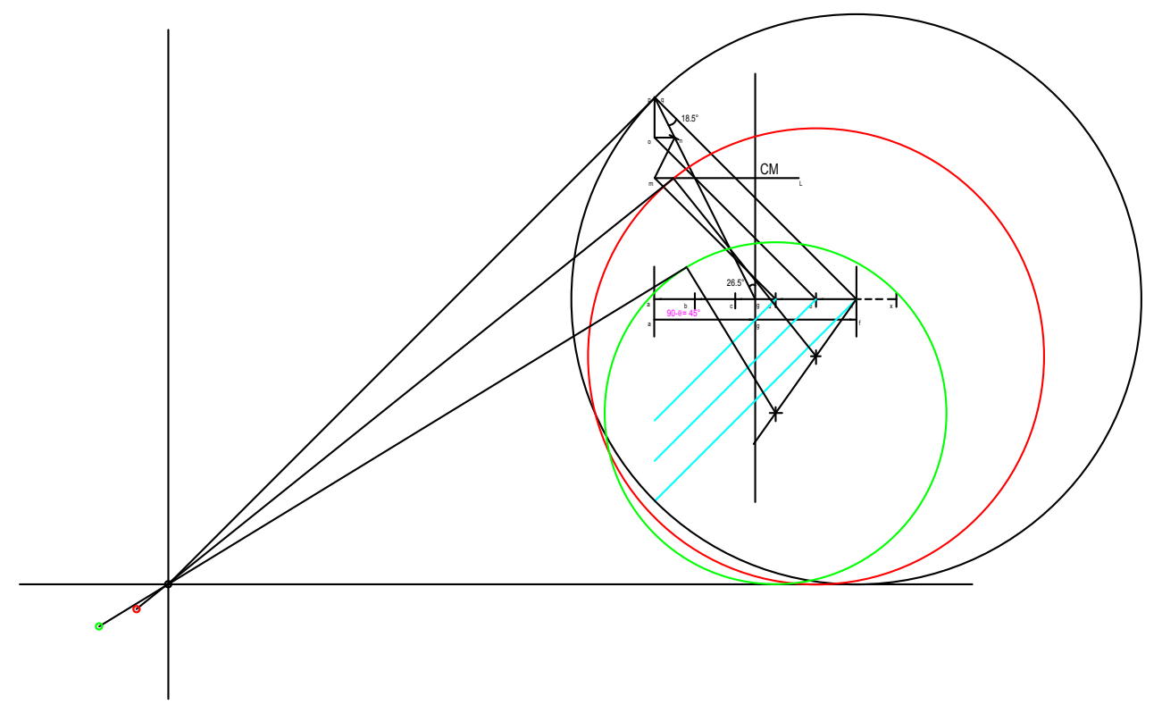


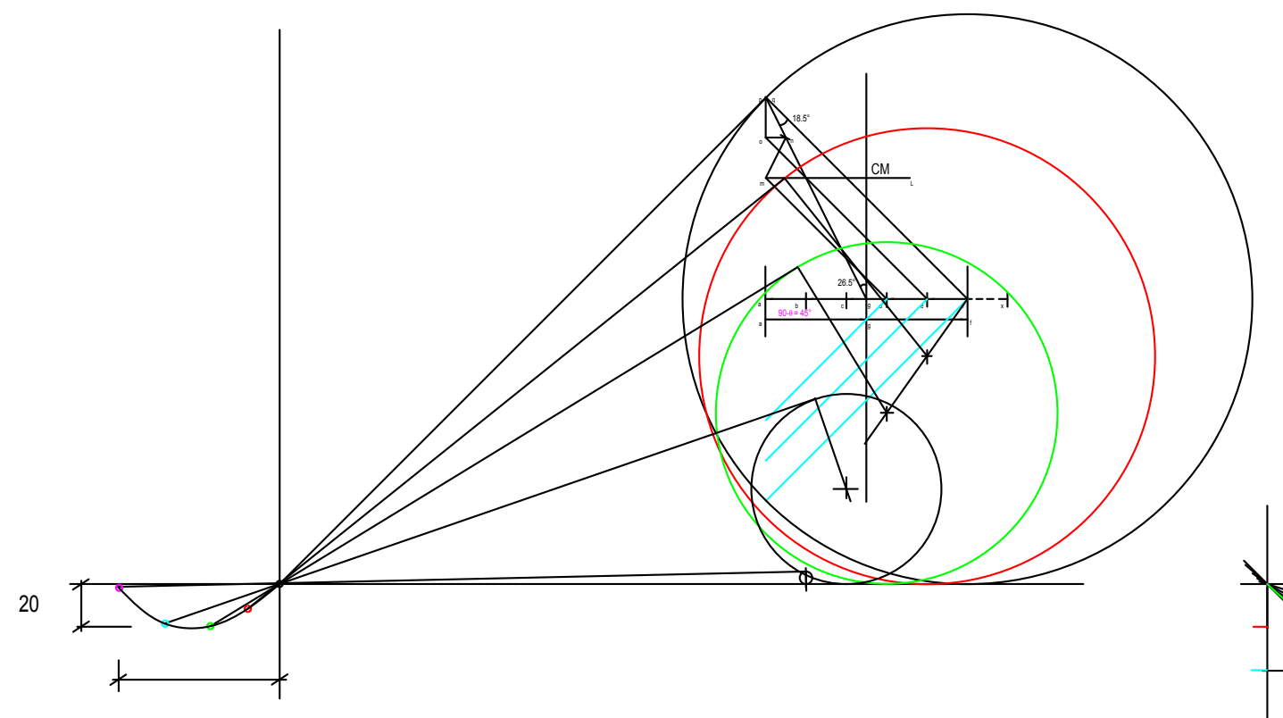
Scissors truss conjugate hyperbola with structure aligned such that the top chords are at 45 and the bottom chords are at 26.5 degree matches the conjugate hyperbola of the pratt truss structure at 63.5 where the force lines are at 26.5 degrees. (would make sense).

There is not need for coordinate transformation.

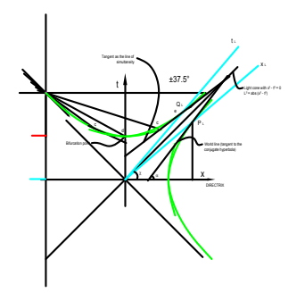
Meanwhile the hyperbola of the 45 degree truss is obtained directly from the pole curve of the scissors truss with the top chords at 45 and the bottom chords are at 26.5 degrees.

With the top chord at 45 degrees, rotate the bottom chord from -18.5 to positive 18.8 degrees and obtain the pole curve of the truss with the top chord at 63.5, and bottom chord at 45 degrees.





76 to 75 for the Pratt truss



Comparing the size of the circles of the Howe truss with that of the Scissors truss:

Expansion by 1.67 fold at zero degrees, when the truss is just about to buckle - white to green
From the figures it is obvious that if the chord in the truss was to break the energy would increase five fold 67.75/13.4 = 5.05

Currently, the allowable factor of safety of masonry anchors is taken as 5.
Ref.: Hilti Anchors Design Guide / Manual

5.05 expansion White to white Factor of safety of 5
It appears that no cold stellar configuation can have a mass exceeding 5 M*, the critical point above which our truss is considered to have buckled. M* corresponds to the mass in the state where the kinetic and potential energies are equal. No star more massive than this must reduce its mass below this limit if it is to fade away into quiet obscurity....." Ref. Gravitation, pb. 627, Pulsars, Neutron stars, Quasars, Supermassive stars.

1.64 (1.76 at 4°)	expansion	Red to red
2.46 (2 at 4°)	contraction	green to green

During buckling, with the bottom chord at 0 to 4 degrees, the laod is transferred to the support, hence the load on members MD and CL decrease.

Beam analogy - Devide the truss and the diagram into zones according to stress:
at the support we have shear, at midspan we have bending, and at $\frac{1}{3}$ we have both bending and shear stresses. If we associate the white circle to shear, the red to the combination of bending and shear, and the green to bending stresses, then factors of safety would correspond to the corresponding state of stress.

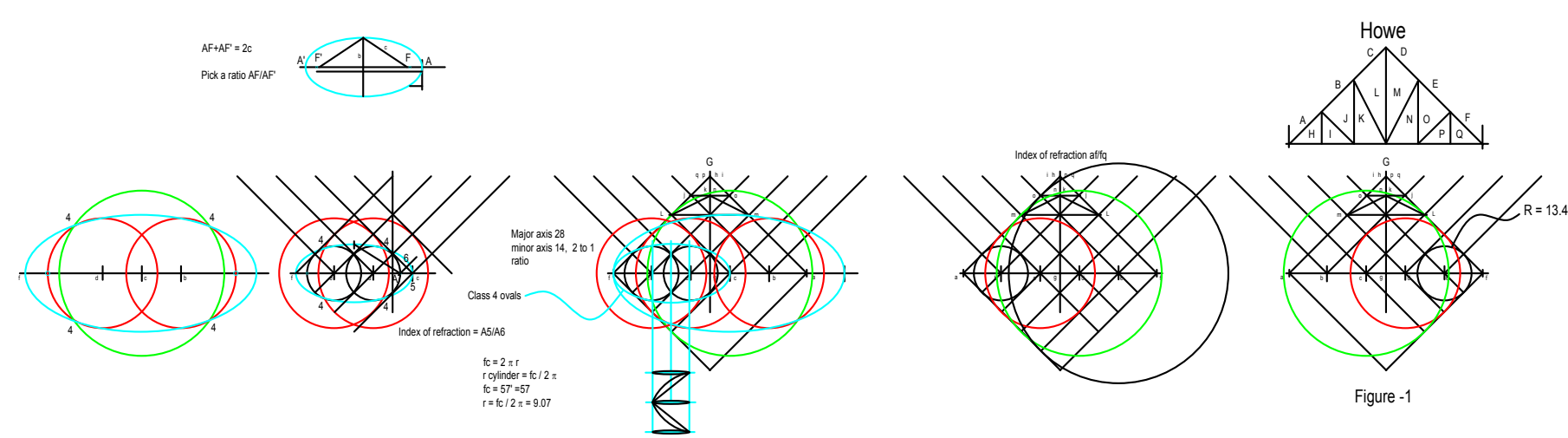
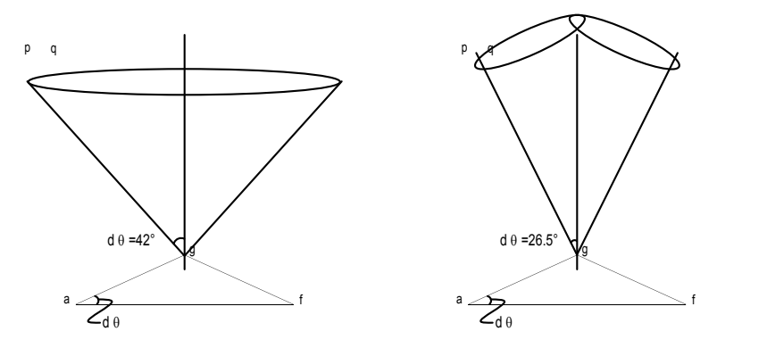


Figure -1



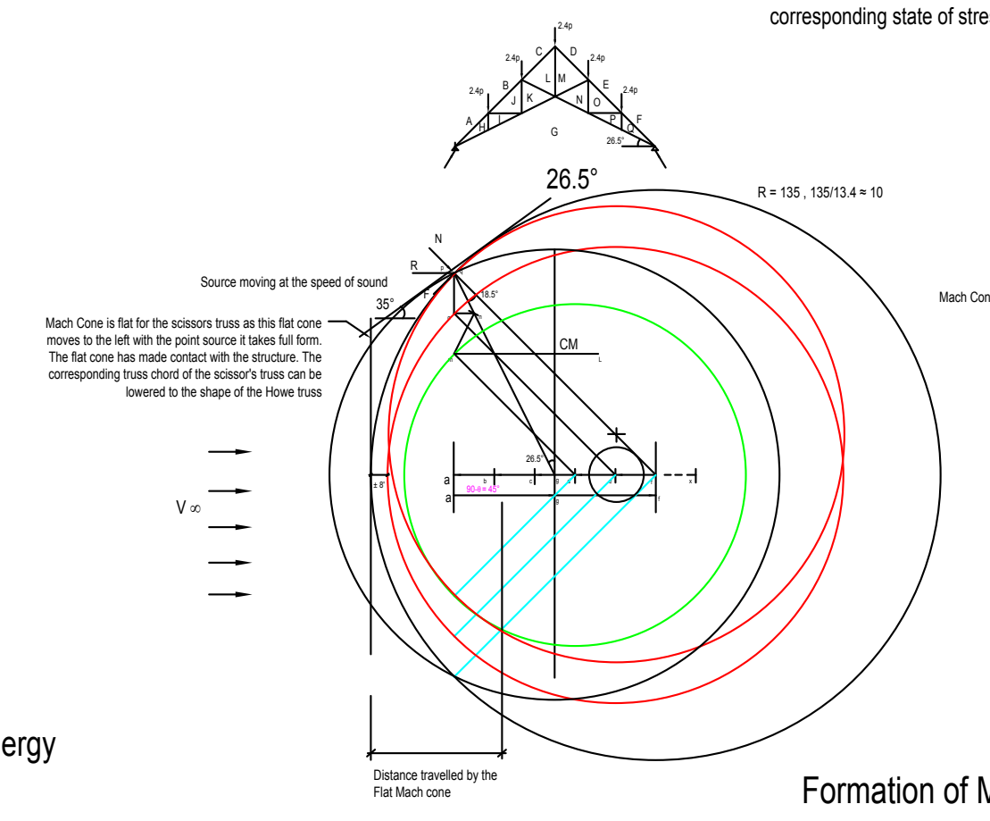
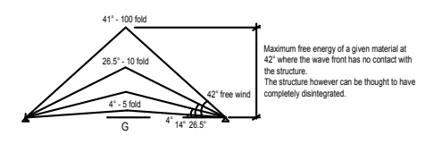


Figure -4



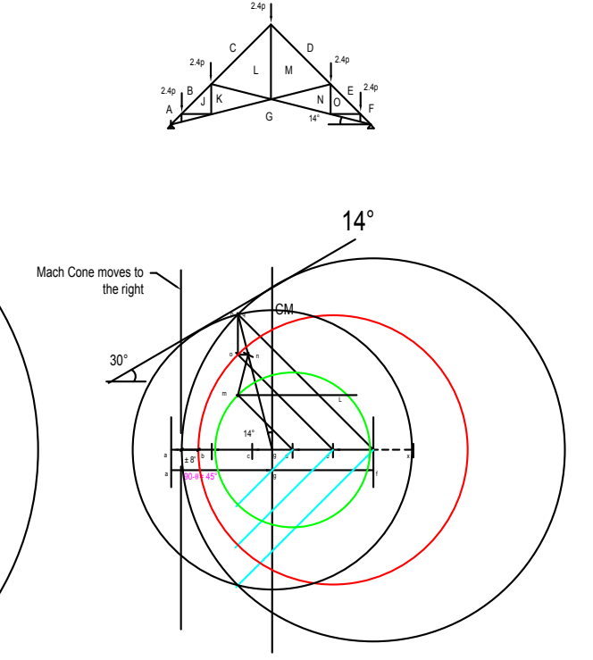


Figure -3

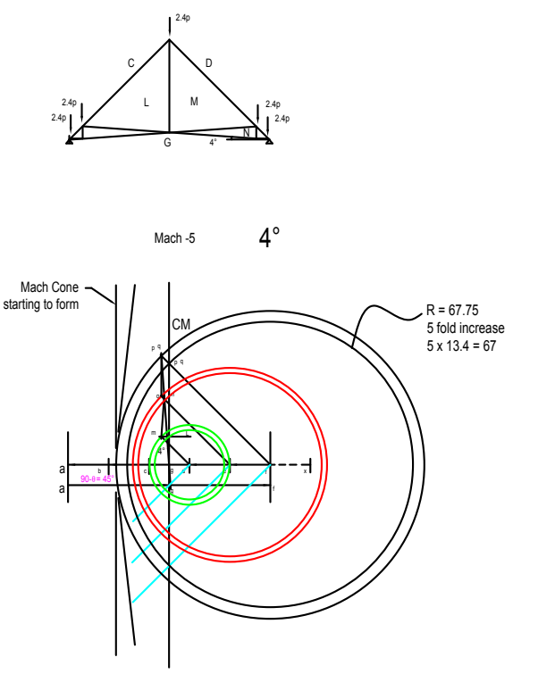
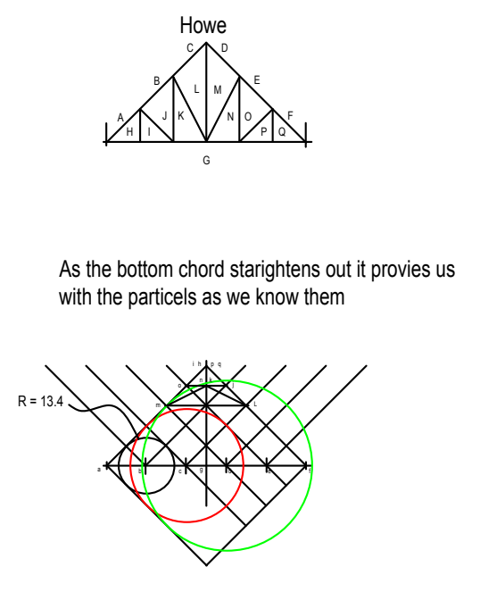


Figure -2 - initiation of crack propagation at 5 fold energy increase. As the crack is developed matter (the material) is transformeded into energy



As the bottom chord starightens out it provies us with the particels as we know them

As the height of the bottom chord is increased, we approach the free wind vlocity at 42°. We take this as the maximum deformatio energy of a given material.
The energy increase is 100 fold from 26.5°.
At 42°, there is one wave front and as the angle of the bottom chord is decreased two wave fronts start to form.

With the bottom chord of the scissors truss at 26 degrees the wave particles have made contact with the structure. Lets call this the elastic point.

As we decrease the bottom chord to 4 degrees and less, the mach cone starts to wrap around the structure.

In reverse, the maximum energy

Across the beam cross section, as it is deformed, there will also be two wave fronts. One working to stretch the beam and one to compress it.

Up to 26 degrees, one can with an appropriate factor of safety, assume the bottom chord is still intact, but the total energy should be devided by two to account for the tension and compression.

Taking the deformation of the bottom chord to be proportional to strain, we can associate the energy curve of the Scissors truss with deformation and starin, and that of the Howe/Pratt truss with stress.
The load/stress path at 26° degrees and the strain path at 45° degrees will then result in compatible stress - strain states.
In a sense, what we are saying is that since the truss with its bottom chord straight is so rigid, we will take its stress and to relate it to strain we will raise the bottom chordl.

Formation of Mach cone - Point source moving to the right - wave front appears to be moving to the left
The Mach cone is flat in figure-4 and starts to form as it moves to the left and the bottom chord is lowered, figure-2, and is in full form for the Howe truss figure-1.

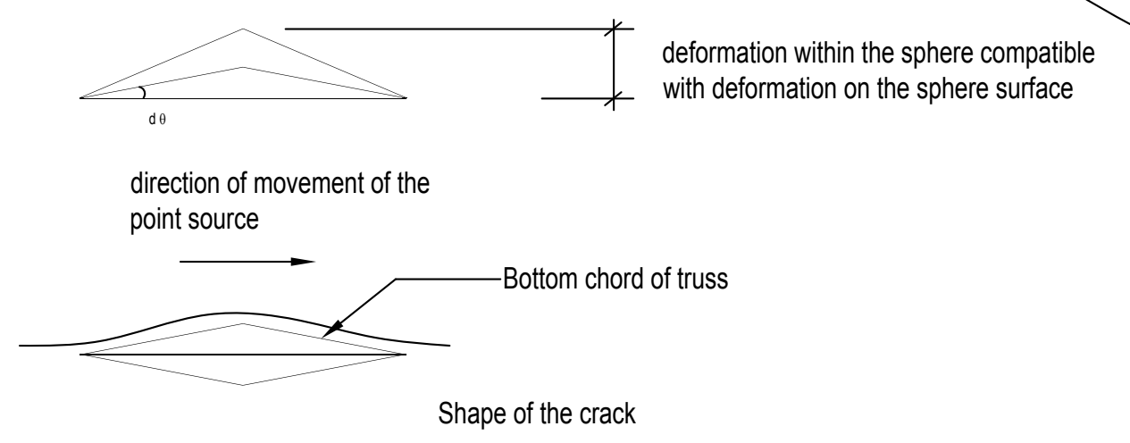
Going from right to left, we raise the bottom chord of the truss at an angle 4, 14, and 26.5 degrees
The observer at - a - has not received a signal until the figure to the left at 26.5 degrees

As for the application in crack propagation, Figure-2 represents the onset of macro crack propagation or where the width of the crack is such that the crack will start to propagate to the right and leave a wider gap at its tail.

As the width of the crack increases (macro-cracking) in figures 3, and 4, and the material has been destroyed around the point source the magnitude of the energy waves will become larger.

Hence in the case of crack deflection, the width of the crack is larger than if the crack is propagated in a straight line.

For the shock wave, as the free wind velocity and infinity, moving left to right, is increased the mach cone will start to form. This can be observed in figures 4 , 3, and 2, respectively.

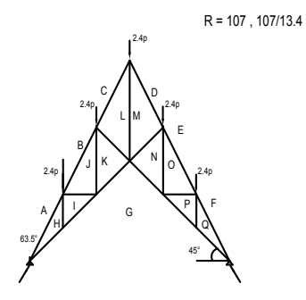


Application to shockwaves

To physically relate the point source to the structure, take the scissors truss.
As the bottom chord breaks to form the scissor, the point source does not move in a straight line but deflects at an angle and follows the bottom chord.

The factor of safety was calculated as 5.

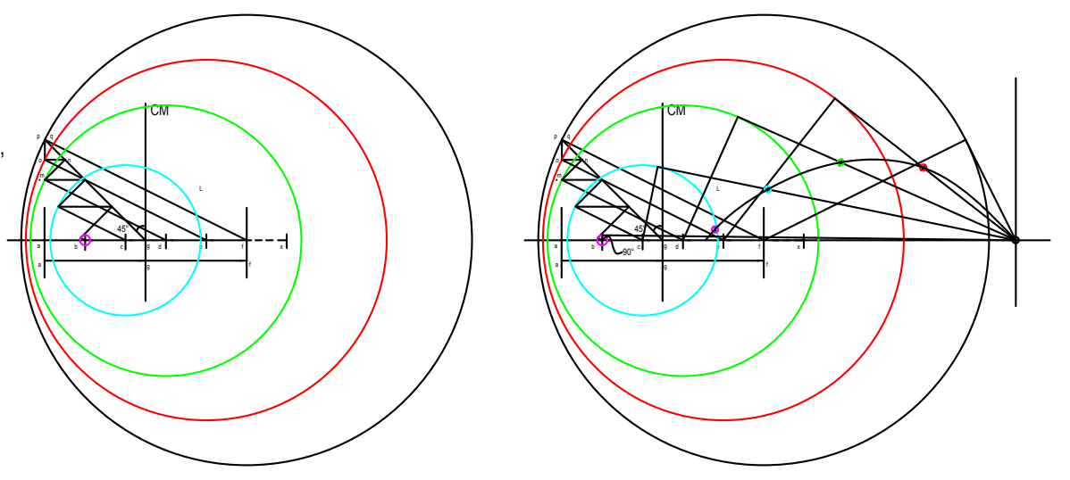
passed the 42° mark, the top and bottom chords have reversed.

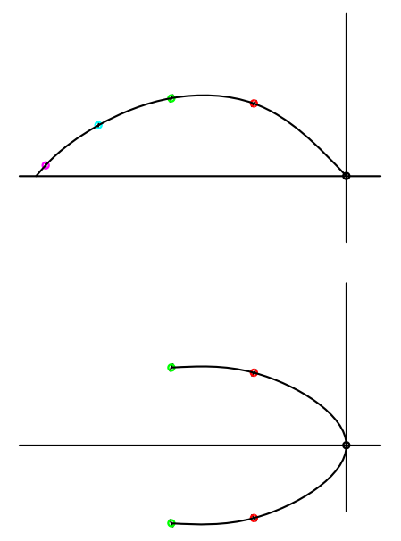


Conjugate pole curve of the pratt truss obtained directly from the scissors truss with 63.5 and 45 top ang bottom chord without the need to expand and or contract.

Rh = 13.25

ntoe: radius at b is 2'-6" , 1 /5 that of radius of the higgs boson Rh





keep increasing the angles to 4° and 8° degrees which makes for a structure with angles 82° and 86° degrees. Hence we have a straight line that branches out into the scissors truss.