To: Melanie and Priscilla

From: Grandpa - Dad

Subject: Fundamental Physics - Relationship Between Centrifugal Force,

             (Inertial Resistance), Rotation and Energy To Establish and

             Sustain Rotation.

The above relationship is critical to the Inertia Engine Concept and a
lack of clear understanding of it ,among even technically oriented and
thoroughly experienced people , has been the primary obstacle to my
conveying this concept to others, including the U.S. Patent Office.
                        are
For this reason, if you/to ever achieve "Read it Back To Me " status in
your understanding of this concept, I feel that you must reach a clear
and complete understanding of subject relationship, first.

I had previously thought that ,as my first approach, I would use the
orbiting of a Shuttle Craft as an existing and functioning example of
the relationship and positive proof that Inertial Resistance is
generated solely by rotation and is not derived from Energy to establish
and/or sustain rotation, as most people seem to believe.

However as I was processing this (20) page "Family of Graphs" document,
I realized that I have the required documented proof right on hand, in my
files, which , I believe, will be much more convincing.

I am enclosing copies of Sheets (2) of (20) and (5) of (20) from the
"Family of Graphs" document.

Referring to Sheet (2), note that,at 39,600 RPM ,there is an Inertial
Resistance Bursting Force of 100,000 pounds attempting to break the
combined sections,of the Nozzle Ring and End Bells,into two equal halves.
This is a formidable force ,50 tons, but even more formidable is the
total Inertial Restance Bursting Force that acts radially outward in all
directions from the center of rotation. The value of this Force:

=   3.1416   x   100,000   =   314,160 pounds   =   157.08 Tons ！！

This is the equivalent of the load carried by (4) Railroad Cars！！！

It is difficult to realize how powerful Inertial Resistance really is
especially when I realize that I have generated such forces every time
I've run a test in the 40,000 to 50,000 RPM range.

Bear in mind ,such forces had nothing to do with the total force that
could be exerted by the Nozzle Thrust that sustains such speeds or the
forward tangential Kinetic Energy of the Rotating Nozzle Ring and End
Bells. The forces are there simply because of the high rotational speed.
This generates a constant , high rate of acceleration toward the center.
It requires a large force to generate such acceleration and ,of course
the Inertia of the parts resists such acceleration with anequal and opposite force that
threatens to break the parts in half.

The Input Energy - Inertial Resistance Relationship - Continued:

Referring to the fundamental Equation, $(F) = \frac{(W)\,(a)}{(g)}$:

The Force (F) doing the accelerating towards center = 314,160 pounds

The Weight (W) of the two parts combined = 3.164 pounds

The rate of acceleration (a) = $\frac{(F) \times (g)}{(W)}$ = $\frac{314,160 \times 32.16}{3.164}$

= 3,193,232 feet per second , each second or 3,193,232 ft/sec/sec.

What this means is that, starting from zero velocity, if the 314,160 lbs.
Force is applied, for one full second , to the 3.164 pound Weight, it
will have achieved a forward velocity of 3,193,232 feet per second at
the end of that second. The rate of acceleration is, indeed, very high.

If , as many unimformed people believe, this very large force is
derived from the energy that sustains rotation plus the forward
tangentially directed Kinetic Energy of the rotating parts, such energy
can be extracted and applied only by opposing the rotation with a
force of 314,160 pounds continuously. In the calculations below, the
length of time such a force can be applied before all of the Kinetic
Energy is consumed, is determined.

Referring to the Graph on Sheet (5), the Thrust, from the (12) Nozzles,
is 9.500 pounds, at 39,600 RPM. This/too small a force to consider.
The mean radius to Center of Gravity of the Nozzle Ring and End Bells
= 2.125 inches . Then the tangential velocity of the two parts at (R):

= $\frac{2 \times 3.1416 \times 2.125 \times 39,600}{12 \times 60}$ = 734 ft/sec = (V)

The Kinetic Energy of the rotating parts = $\frac{W \times V^2}{2 \times 32.16}$ = $\frac{3.164 \times 734^2}{64.32}$

= 26,502 foot-pounds

If the 314,160 pound force resisted rotation, the distance moved to achieve

zero velocity = 26,502 / 314,160 = .0843582 feet = 1.012 in.

The Input Energy - Inertial Resistance Relationship - Continue

At 39,600 RPM, the revolutions per second = 39,600 / 60 = 660 ev/sec (RPS)

The time for one revolution =   1   /   660   = .0015151 seconds

The circumference at the radius to center of gravity:

=   2 x 3.1416 x 2.125   =   13.352 inches

Then the time that the 314,160 pound force can be applied:

=   (1.012   /   13.352)   x   .0015151   =   .0001148 seconds

From the above , it becomes obvious that anyone who believes that

Centrifugal Force or Inertial Resistance is derived from Tangential

Kinetic Energy or rotation sustaining Input Energy, is simply not

informed on this particular subject and has never taken the trouble

to check it out mathematically.

End of this important lesson on Fundamental Physics pertaining to the

Inertia Engine Concept.

Family of Graphs - Continued:

Bursting Force

200

Pounds

x 1000

150

100

50

0

Safety Factor

Inertial Resistance Bursting Forces

On the Combined Weakest Sections Of the

Nozzle Ring and End Bells

and

Safety Factors Applying Thereto

vs.

Rotor Assembly RPM

Safety Factor

2000 Pounds

.050

Bursting Force

4.500

4.000

3.500

3.000

2.500

Note: Approximately 2.00% Of The Bursting Force Shown Is Actually From Internal Pneumatic Pressure.

2.000

Note: Since their weights are distributed on a longer radius to Center of Gravity, the Nozzle Ring and End Bells are the parts, of the Rotor Assy, most vulnerable to Inertial Resistance Bursting Forces, the Nozzle Ring being most vulnerable and the End Bells second most vulnerable. Since the Flanges of the End Bells, encircle and over lap the Nozzle Ring, it lends support to it from its greater strength. The combined strength of their weakest sections can successfully resist a maximum Bursting Force of 405,296 pounds, without any of their aluminum fibres yielding.
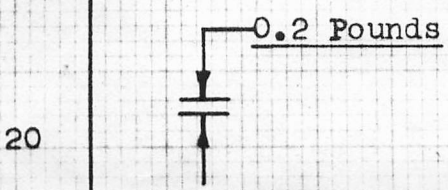
F.M. Knight   7-31-86

250 RPM

1.500

1.000

.500

0

35   40   45   50

Rotor Assembly RPM x 1000

Family of Graphs - Continued:

Thrust

In

Pounds

Total Tangentially Directed Thrust Developed
Collectively At The Twelve Nozzles

vs.

Rotor Assembly RPM

0.2 Pounds

20

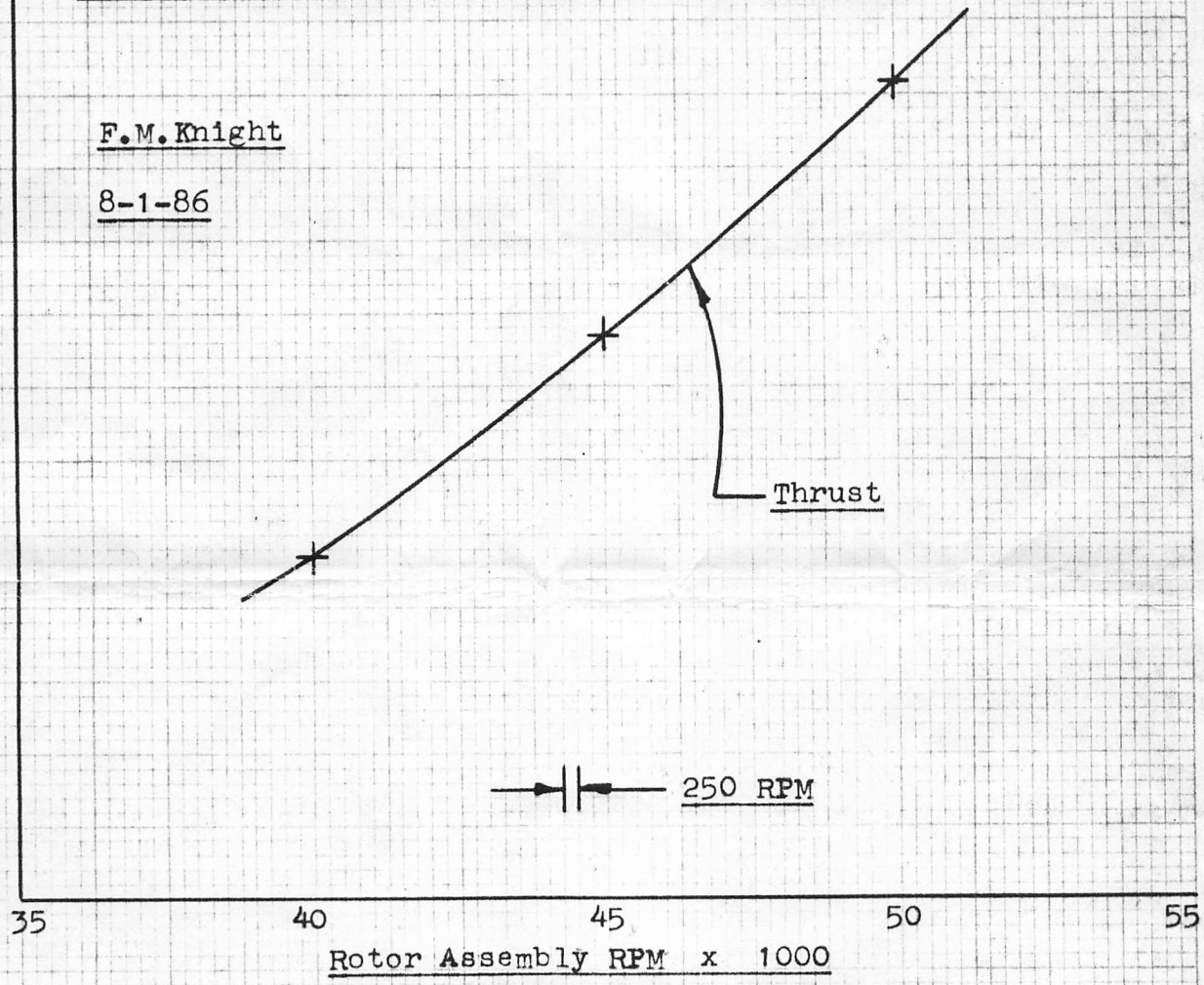**Note:**

Each Nozzle Bore Cross-Sectional Area = .0069102 sq. in.

Total Thrust = Pressure Differential x .0069102 x 12.

F.M.Knight

8-1-86

15

Thrust

10

250 RPM

5

35   40   45   50   55

Rotor Assembly RPM x 1000