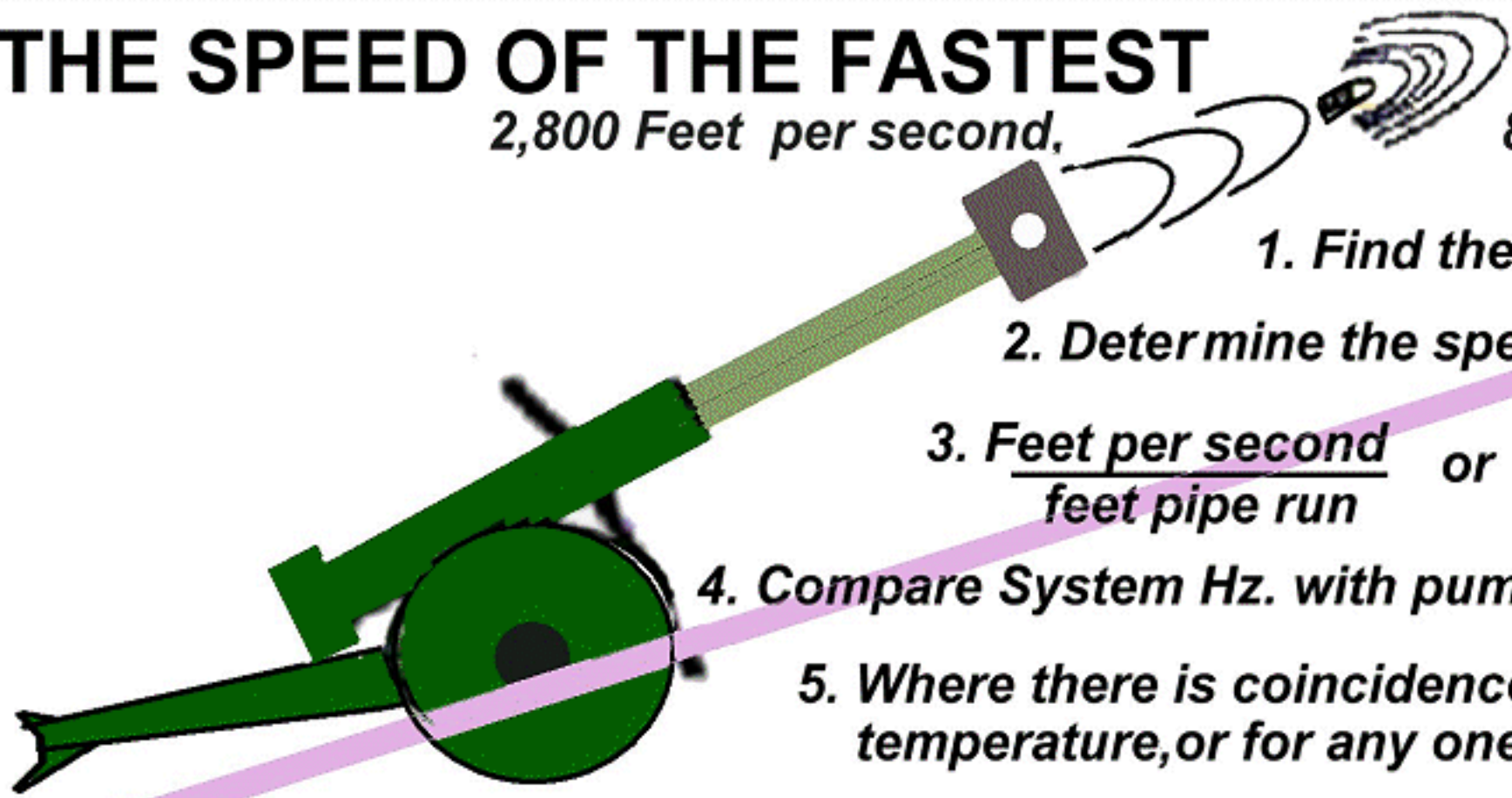


# THE DANGER IS THAT THE PIPE SYSTEM WILL GENERATE A FREQUENCY THAT IT AMPLIFIES.

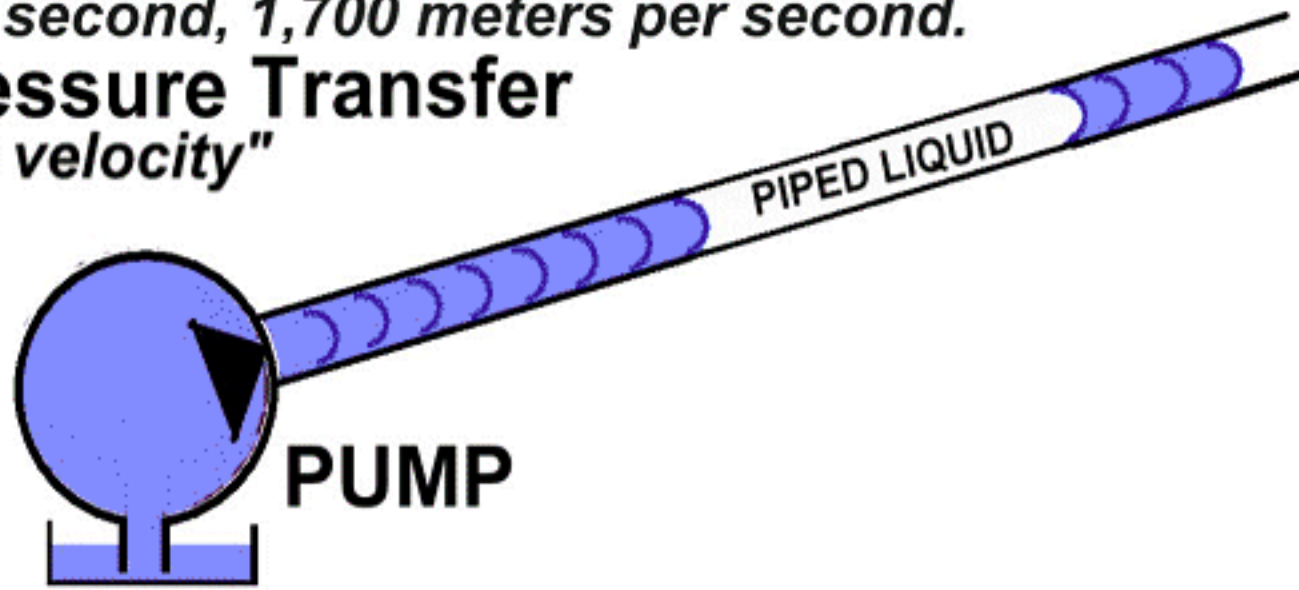


**THE SPEED OF THE FASTEST PROJECTILE, IS HALF -**  
 2,800 Feet per second, 855 meters per second.



1. Find the effective compressibility for the system.
2. Determine the speed of pressure transfer for (1) "softness"
3.  $\frac{\text{Feet per second}}{\text{feet pipe run}}$  or  $\frac{\text{Meters per second}}{\text{meters pipe run}} = \text{Frequency / Hz.}$
4. Compare System Hz. with pump Hz. and Pipe XY&Z natural shaking Hz.
5. Where there is coincidence, or at a power of, any of them, at any temperature, or for any one nodal length, your pipes are a problem.

**THE SPEED OF PRESSURE TRANSFER IN A COLD LIQUID DE-GASSED IN A HARD PIPE**  
 5,600 Feet per second, 1,700 meters per second.  
 Rate of Pressure Transfer aka "acoustic velocity"



**EASY TO PROVE**  
 Change the pressure, measure it a mile away a second later.

BUT YOUR FLOW RATE IS BETWEEN 3ft/Sec & 25 ft/ Sec. SO FLOW FLUCTUATION COULD BE ADDRESSED WITH A BOTTLE ON A "T".

**PRESSURE IS 250 + TIMES FASTER THAN FLOW - SO :**  
**Pressure pulsation can not be addressed without INTERCEPTION.**

Oil the hinges, put the child on the swing, press with 1/2 an ounce / 14 grams once.

& Press with 1/2 Oz. again and again

The Effects are cumulative

**SOON CATASTROPHY**

**PRESSURE PULSATION can be like that too**  
 It depends on system frequency response.

1 psi + 1 psi System Pipe return pulse  
 ← 3,300 miles per hour

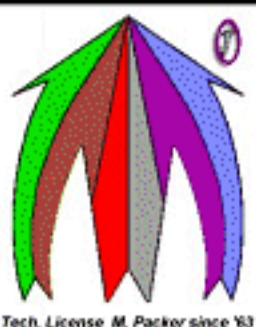
1 psi + 20 psi and again, several times per second  
 ← Faster than a bullet

1 psi + 200 psi  
 After a few seconds

Very soon, FATIGUE OR BURST

It doesn't matter how much you have to begin with, what counts is how much the system turns it into.

**LARGE PIPE - WITH NO DELTA "P", DO NOT SCRUB OUT PRESSURE WAVES - ARE POTENTIAL AMPLIFIERS.**



**Liquid Dynamics International Inc.**

*Analysis, Diagnostics, Prediction by Software*

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