SLIDE 4: EXAMPLE

INITIAL DESIGN: GUESS, TWEEK LATER.

ASSUME ALL SIDES EXPOSED.

α GUESS: METAL, LOW α
OTHER, LARGER α.

α walls & TL REQUIRED → DATASHEET

{ INITIAL $\alpha_w = 0.9$ GUESS }

TL ?

$\bar{\alpha} = 0.84$; IL = 40 dB. SOLVE FOR TL

ENCLOSURE ABSORPTION DOMINATED BY AVERAGE ABSORPTION.

$$TL \doteq 40.8 \text{ dB}$$

SLIDE 5:

HTL-4 MATERIAL. (LAST 2 ENTRIES OF BOTTOM PANEL).

NEED A DOOR.

SEAL ALL THE LEAKS REALLY WELL.

KNOBS ?

BIGGER BOX ... NOT LIKELY. } "HAIRY EDGE"
$\alpha w \to 0.99$ ... NOT LIKELY.

STC NUMBER → SEE LINK IN README.
SEE SLIDE 6 ANIMATION.

SLIDE 6: STC NUMBER = 24

SLIDE 7: SMALL ENCLOSURE

$k \cdot d < 1$; HELMHOLTZ NUMBER

$d << 0.18\,m$ WITH $f = 300\,Hz$.

SLIDE 8: FIG. 12.4 → $F(\alpha)$ → l_{cw} → CLAMPED.
HIGH α; HIGH ASPECT RATIO.

$(A \sim l^2) \to A^3 \sim l^6$

$V \sim l^3 \quad \xrightarrow{C_a} \quad \alpha \; 1/l^3$ IN l_{cw} EQUATION.
$\overline{\Sigma_i C w_i}$

MAKE THE ENCLOSURE TIGHT FITTING.

SLIDE 9:

DEGREES OF FREEDOM: E, V, L. → SPREADSHEET.

METRIC.

IL = 0.59 dB → NOT GOOD

$$IL = 20 \log_{10}\left(1 + \frac{C_a}{\Sigma C_{wi}}\right)$$

SIDE 3/4 TOO COMPLIANT; NOT RIGID ENOUGH.

SLIDE 10

R on THICK WALLS, IL ≈ 37.01 dB

NOT QUITE THERE.

SLIDE 11:

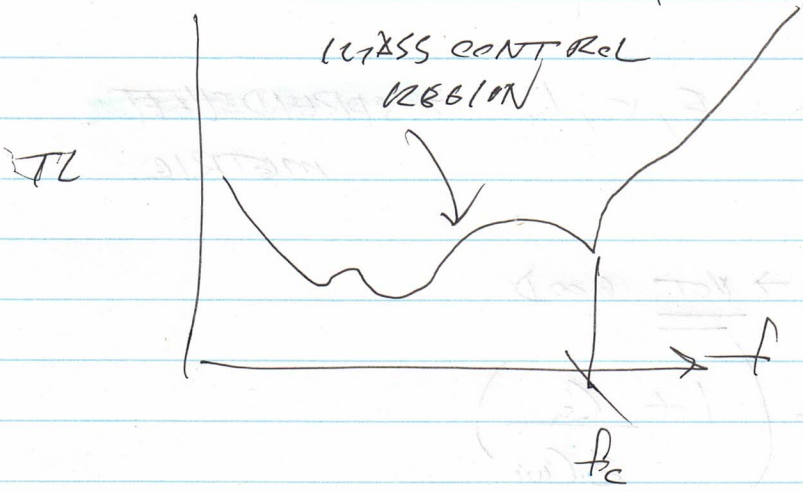
LEAK: $20 \cdot \log_{10}\left(\frac{|C_d| + C_a}{|C_d| \times \Sigma C_{wi}}\right)$ WANT MAG. OF COMPLEX NUMBERS

Cleak ≈ ~~a+b~~ ~~|a|~~ / |b+jc|

LEAK IL ≈ 44.5 dB. GETTING CLOSE TO ~~3/4 Hz~~

CHECK CRITICAL FREQ. 43/4 Hz FOR EXAMPLE.

(THICKER, LOWER CRITICAL FREQ.)



STIFFENING MUST BE DONE IN ALL DIMENSIONS.
IN MASS CONTROL REGION

SLIDE 12:

AREA COVERAGE < 9% → NOT SIGNIFANCT TL (dB).

DUCT DIMENSIONS LESS THAN λ WAVELENGTH
(BUT LESS AT HIGH FREQUENCIES)

NEXT WEEK: VIBRATION ISOLATION

SLIDE 14.