Subject: 1992 CORVETTE LT1 ENGINE BALANCING

(Also 93-96

Many late 1991 L98 and 1992 LT1 Corvettes with 6-speed manual transmissions exhibit objectionable levels of engine vibration and "boom" at engine speeds above 3000 RPM. This apparently resulted from a design change to the dual-mass flywheel in late 1991 which results in its changing balance with speed. The disturbance is reduced to acceptable levels by re-balancing the flywheel (in the car) at 4200 RPM.

Only pushrod (L98 and LT1) engines with manual transmissions are affected. LT5 (overhead cam) engines and Corvettes with automatic transmissions are not involved.

The condition is most frequently observed during hard acceleration as the engine approaches shift points at high speed (over 3000 RPM). Verification of the disturbance is done by observing engine vibration between 3000 and 5500 RPM with the car standing still and the clutch released (foot depressing clutch pedal). Typically, peaks in the disturbance are noted at 33-3500, 4200 and 4700 RPM.

Results of re-balancing engines in 65 1992 LT1 Corvettes have shown a concentration of unbalance in a specific sector of the flywheels. The attached plot is a polar representation of the unbalance magnitude and position for the cars tested. The angular system corresponds to the flywheel as viewed from the front with the "zero" point at the locating dowel (approximately centered on the cast-in counterweight near the rim) the angles increasing counter-clockwise.

Assuming the 65 engines re-balanced are representative of the total population of engines produced, acceptable balancing of most of the cars should be possible by installing balance weights in the area of most frequent unbalance. Specifically, four patterns of weights have been identified that would produce flywheel unbalance at 4200 RPM of 1.0 in-oz or less in 90% of these engines. These are represented on the plot as diamonds; the circles are 1.0 in-oz radius about these points.

WEIGHT PART NO
3890192

Since the unbalanced condition probably exists at an objectionable level in the majority of LT1 manuals, an alert should be transmitted to dealers. Specifically, they should be informed that vibration at engine speeds over 3000 RPM which can be observed with the car parked and clutch released is likely to be flywheel unbalance and cannot be corrected by replacing parts. Re-balancing of the flywheel will be required. A package of instructions and balance weights (10 to 12) should be furnished.

Re-balancing would proceed as follows:

1) The starter and oil filter are removed to gain access to remove the clutch housing front cover.

2) Starter and oil filter are re-installed.

3) Using a sharp pointed paint pencil, mark the balance holes in the flywheel corresponding to the attached sketch.

4) Engine is brought up to operating temperature (at least 140°F coolant).

5) Operate the engine with the clutch released (foot on pedal) between 4000 and 5000 RPM and carefully note vibration level.

6) Install balance weights at first trial location. The attached table and drawing describe these patterns.

> NOTE: The trial weight patterns have been arranged so that the first pattern is projected to "fix" 50% of the complaint vehicles. Each of the remain patterns is less likely to be successful. Also, the first pattern is expected to improve over 90% of the vehicles.

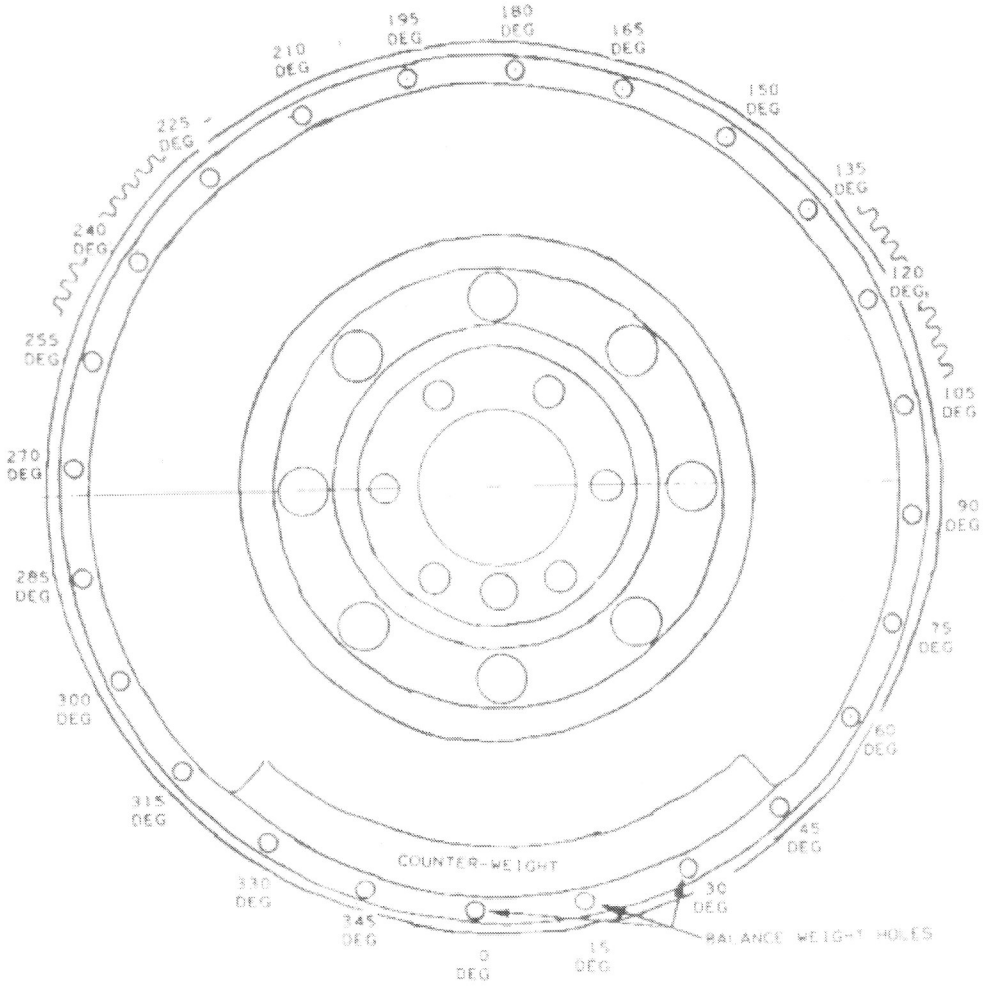
Balance weights should be installed with at least 1/16" exposed so they can be gripped with side-cutters for removal. Once acceptable balance is obtained, weights are fully seated flush with flywheel face.

7) Again operate the engine as in step (5) and evaluate vibration. If disturbance level is acceptable, install weights fully and re-assemble flywheel cover.

8) If vibration in step (7) is unacceptable, remove weights and install in next pattern.

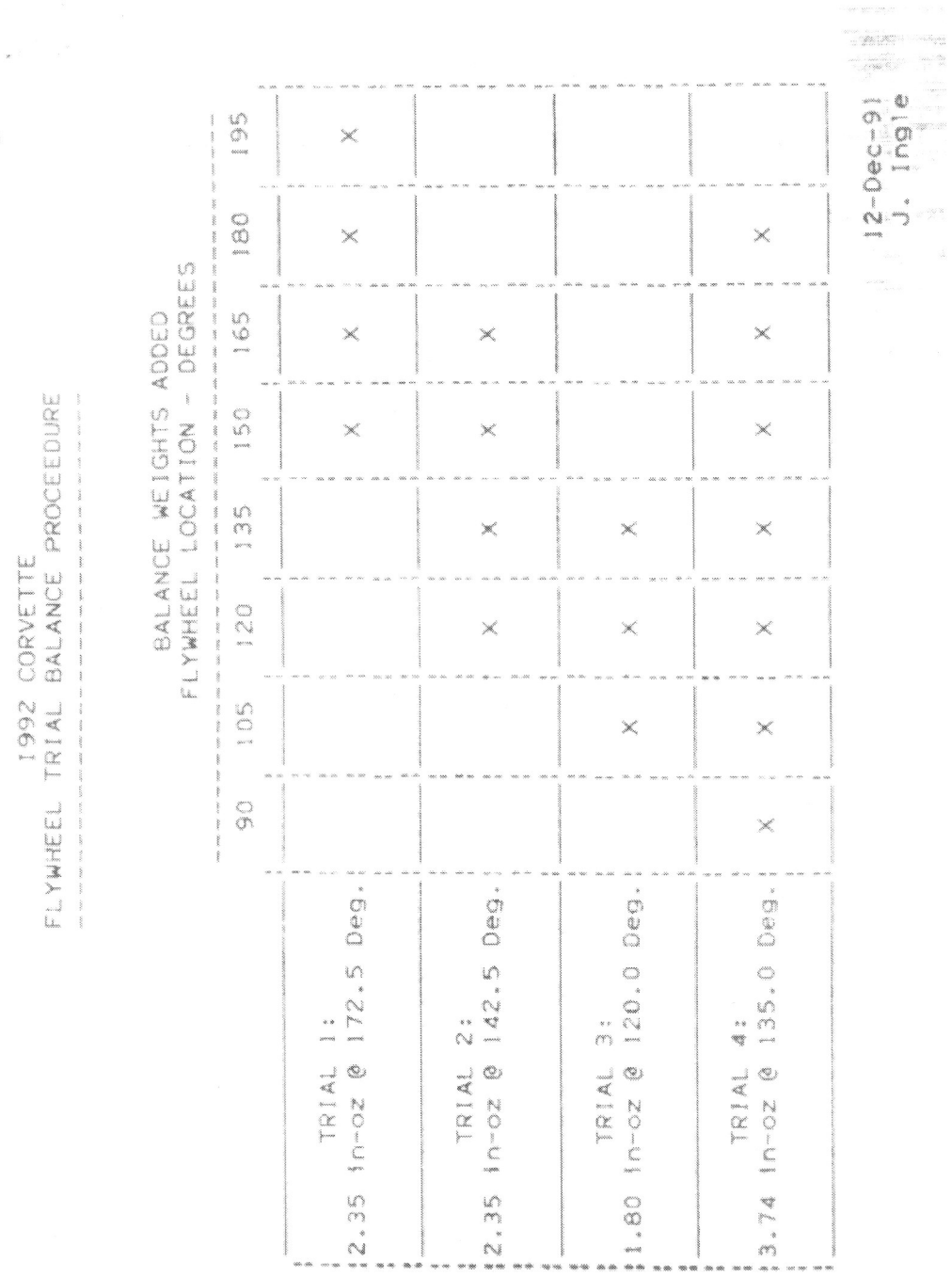
9) Repeat steps (7) and (8) until acceptable performance is obtained or all patterns have been evaluated and none was acceptable. (From the data obtained thus far, at least one pattern will provide an improvement.)

If none of the patterns achieves acceptable performance, experimenting with moving the weights slightly from the best pattern may achieve success. Beyond that, improvements will require instrumented balancing.




L98/LT1 CORVETTE FLYWHEEL

FRONT FACE




TIP:
Do NOT push the weights in all the way so you can remove them more easily. YOu nee remove them to try the different trials and find which one works best for your car.

If you decide not to push in the weights all the way make sure the weights aren't goin the trans/bell housing as the engine spins. Just put the car in 6th gear and turn one o rear wheels.

*Last edited by Bluewasp; 02-27-2006 at 09:35 PM.*