# COMPARATIVE RESEARCH BEDFRAME BEHAVIOR ON A LATHE NORMAL VARIATIONS CAUSED MOLDED OR WELDED TO THE REQUESTS OF FORCED VIBRATIONS

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**Abstract:** Determination and comparison of forced vibration on the structure of the two frameworks, cast and welded - vibrations caused by sitting idle structures over the entire speed range. The force on frame section on both tip of frame, cast and welded, can crate very dangerous vibrations on the lathe structure.

**Key words:** Comparison, lathe, vibrations, structure, force.

## 1. EXPERIMENTAL CONDITIONS.

On lathes with cast and welded frame, operating conditions measurements were made on several fronts' structure frameworks in figure 1 in the following conditions:

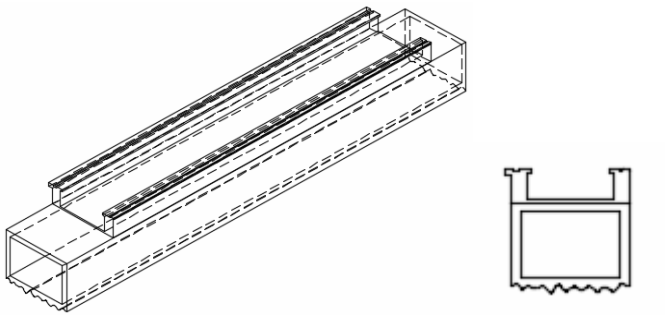

**Fig. 1.** Structure frameworks

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a. Parallel lathe with cast frame fixed foundation; Parallel lathe with welded frame fixed foundation;

b. Parallel lathe with cast frame fixed to the main shaft foundation and having unbalanced mass; Parallel lathe with welded frame fixed to the main shaft foundation and having unbalanced mass;

c. Parallel lathe with frame cast fixed to the rubber media.

d. Parallel lathe with welded frame fixed to the rubber mat.

e. Parallel lathe with frame cast rubber fixed on the main shaft and having unbalanced mass.

f. Parallel lathe with welded frame fixed on rubber and having the main shaft unbalanced mass.

**2. TYPE OF WORK.**

For each of the test conditions specified in paragraph 2 were made measurements of vibration on the structure frameworks both in front and in the back. The measurements were carried out in the horizontal direction on the guides and to the base of the frameworks and on the guides in the vertical direction. Measurements were performed passing lathe through the entire speed range from minimum speed to maximum speed both under normal idle running, and if you to the main shaft of the lathe stand mounted a mass unbalanced that would simulate a piece eccentric.

The means of measurement are:

a. Vibrometer RFT

b. Transducers seismic type KD 34

c. Oscilloscope memory

The measurement results are shown in graphics figures 2, 3, and 4.

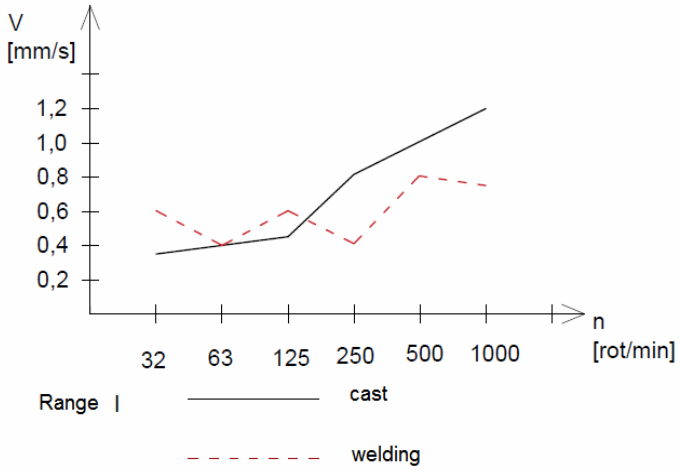


**Fig. 2.** Range I

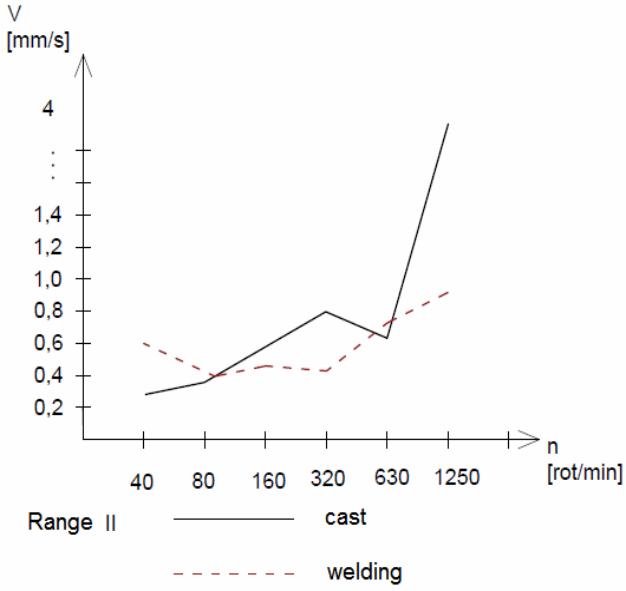


**Fig. 3.** Range II

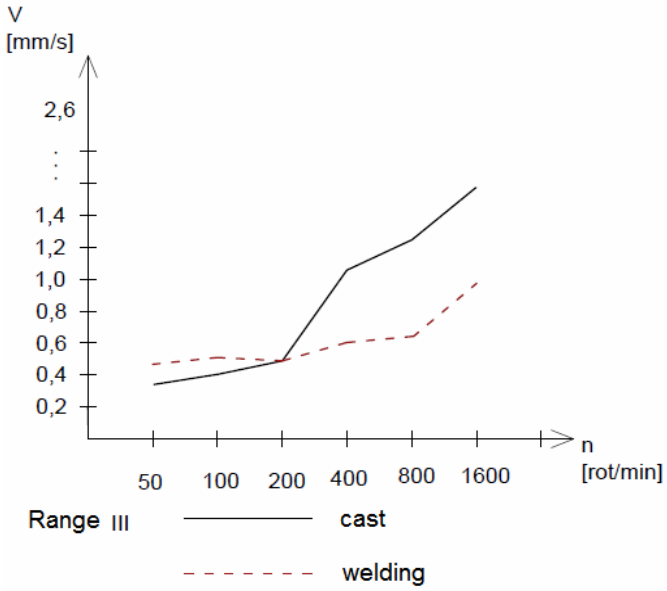


**Fig. 4.** Range III

## 3. CONCLUSIONS

Comparing the vibrations in points 1 and 6 that is horizontally and vertically frameworks of the headstock speed near the three ranges of speeds in conditions lathes

affixed to the foundation, we find:

1. At low speeds in each range on frameworks vibration levels are about the same cast and welded horizontally and vertically.

2. At higher speeds vibration levels to the framework of each game cast is slightly larger than the welded machine frame.

The level of vibration of the speed shown in Figure 5.

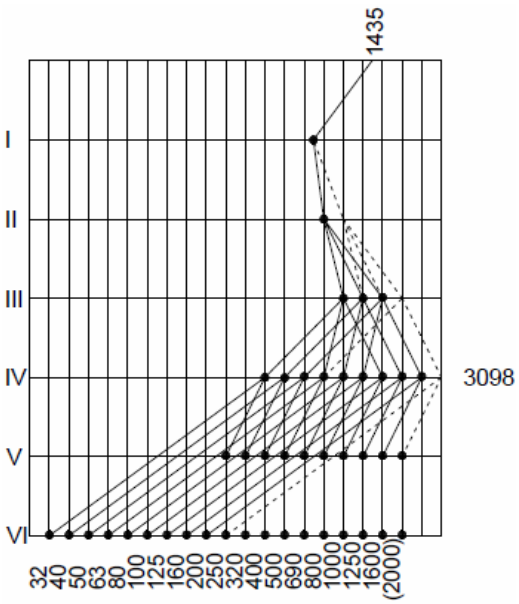


**Fig. 5.** Speed shown

Making the same comparison as above but having a lathe spindle unbalanced mass vibration level on frameworks welded and cast with the same size except the maximum speed of each range where measured value is greater welded to the framework.

By comparing the measurements with mass without mass unbalanced and unbalanced mass is observed that the influence is particularly evident in the maximum speed of each game.

Comparing the conditions lathes vibration rubber mounts fixed on the same sites as in the paragraph reveals.

In the horizontal direction vibration welded to the framework is slightly larger than the frame of the tower where the normal operation of lathes and lathe spindle when using an unbalanced mass.

In the vertical direction to the normal operation of the vibration frameworks lathes and welding cast is the same.

In the vertical direction, the functioning of axis lathes with the unbalanced mass is observed that at high speeds in each range to the framework poured vibration level is somewhat higher than in the weld.

Unbalanced mass influence for both frameworks manifests maximum speeds in each range.

Vibration along the bed frame in the horizontal direction measured at the base of the bed frame shows equal values for the two frameworks cast and welded.

Vibration along the bed frame in the vertical direction indicates approximately equal to the two versions of frameworks.

At maximum speed of 1600 rev / min unbalanced mass settlement has a big influence on the foundation of lathes, vibration mid frameworks are small and very large heads, would show a tendency to twist around the center of gravity.

More influence unbalanced for all directions of measurement is more to the frame in the headstock, the vibration transmitted along the bedframe having a downward slope from area to area of headstock and tailstock.

### 5.1. Conclusion on vibrations cross-sections of the bedframe.

#### 5.1.1. At parallel lathe fixed foundation.

Headstock lick of frame section - presents vibration approximately equal to two frame variants, except maximum speeds in each range in which the vibrations to the frame of the cast is greater than the weld.

Bedframe middle seat section presents vibration approximately equal to two frame variants except the maximum speeds in each range in which the vibrations knock cast is greater than at the weld.

Tailstock lick section presents approximately equal to two frame variants. In all sections in frame vibrations in the vertical direction is somewhat smaller than in the horizontal direction.

#### 5.1.2. Parallel lathe set the foundation with the main shaft unbalanced mass.

Next section presents the headstock -vibration approximately equal maximum speeds range except II (1250 rev / min) and range III (1600 rev / min) on vibrations to the frame of the cast are higher than at the weld.

The section from the middle of the bed frame, shows the value about equal to the vibrations except the maximum speed (1800 revs / min) at which the values of the frame of the molding are greater than in the welding and speeds at 400 and 800 rev / min to the vibrations to the frame of the welding they are somewhat higher than in the cast.

#### 5.1.3. Parallel lathe fixed on rubber

Section next to headstock, no great differences in the level of turn two frame variants except the maximum speed 1600 rev / min to cast values to the framework are

higher than at the weld.

Cut the middle bedframe, no great differences in the level of vibration in two variants frame.

Section next to tailstock, no great differences in the level of vibration in two variants frame.

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