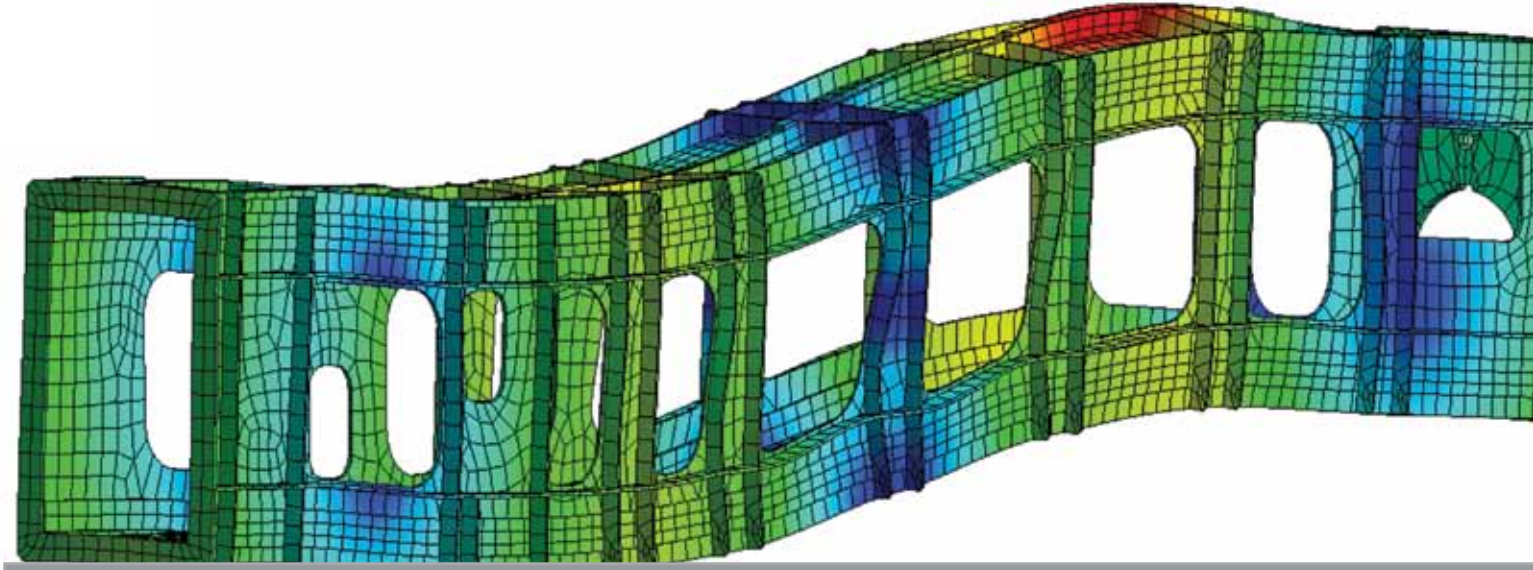

EQUIPMENT AND PROCEDURES FOR LOW-FREQUENCY VIBRATION TREATMENT

JOINT STOCK CORPORATION
SHIPBUILDING & SHIPREPAIR
TECHNOLOGY CENTER

Low-frequency vibration treatment (LFVT) is a complex of vibration treatment procedures, intended to relief residual stresses of steel structures and to stabilize shape and dimensions of the same.

For many years JSC SSTC develops procedures and designs equipment for LFVT and accumulated significant experience in carrying out LFVT of various structures at shipyards and engineering plants.

LFVT is intended to remove structurally unstable state of metals and alloys caused by thermal deformations which appear during fabrication and processing of metal structures, i.e. welding, tempering and casting.

Application of LFVT results in achieving high dimensional stability of metal structures, stabilization of metals and alloys including also welded joints.

LFVT is based on stabilization of properties of metals and alloys similar as that, provided by thermal treatment – this allows to apply vibration stabilization instead of expensive thermal stabilization.

LFVT consists in exposing the structure to alternate loads on frequencies that are equal to or close to its own oscillation values. This allows to obtain resonance effect and subsequent significant oscillation's amplitude value at relatively small efforts. Alternate load is generated by electromechanical vibration generator that actually is a motor with balance weights.

Vibration treatment has following essential advantages compared to thermal treatment:

- Minimal resources consumption (electric power and time);
- Preservation of article's exterior (absence of slag, preservation of coatings);
- Articles, manufactured from dissimilar materials can be treated;
- Large-scaled structures can be treated.

Samples of structures subjected to LFVT by JSC SSTC

Equipment model, overall view	Upper oscillation frequency, Hz	Maximum vibration force, kN
Standard equipment VTU-01M2 	100	18
New equipment Resonans I100-17 	120	20

Advantages of new equipment:

- Vibration proof AC motor provides extension of service life of whole vibration generator;
- Bandwidth of vibration generator is expanded to 120 Hz, the same allows to broad range of articles to be treated and to carry out treatment on higher resonance frequencies, thus increasing LFVT efficiency;
- Symmetric arrangement of unbalanced weights on motor shaft allows to decrease load on bearings, thus increasing service life of the same;
- Printer, that is built in control console, allows to print-out data on frequency value, vibration acceleration, vibration displacement and motor current in numerical view or as diagrams.

JSC SSTC is ready to carry out LFVT of various structures using own equipment and specialists and also to develop customized LFVT procedure for further implementation.

JSC SSTC has patented a number of procedures for elimination of structure's deformations by LFVT, which ensure fabrication accuracy of the structures.

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