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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

JB/T 10375-2002

**Recommended practice for vibration stress relief on welding
structure**

(English Translation)

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Foreword

This Standard was proposed by China Machinery Industry Federation.

This Standard shall be under the jurisdiction of National Technical Committee on Welding of Standardization Administration of China.

The drafting organizations of this Standard. Harbin Welding Institute, Sichuan Liying Technology Co., Ltd., Heilongjiang Hailun Vibration Stress Relief Co., Ltd., Xi'an University of Technology, Shanghai Jiaotong University.

1 Scope

This Standard the recommended practice for vibration stress relief on welding structure, including the selection of technical parameters, the technical requirements and the method for evaluation of vibration stress relief effects.

This Standard applies to the vibration stress relief on fusion welding structures of carbon structural steel, low alloy steel, stainless steel, copper and copper alloys, titanium and titanium alloys.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrigenda) or revisions do not apply to this Standard, however, parties who

reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

JB/T 5925.2, Machinery vibrating stress relief device - Part 2. Technical requirements

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

exciting point

A point to which force is applied to a structure during vibration stress relief is called an exciting point.

3.2

support point

A position of a supporting structure which is chosen to provide vibration stress relief for a structure.

3.3

dynamic stress

The stress which is generated in a structure when an exciting force produces resonant responses, is called dynamic stress. The symbol of the vector is σ (amplitude), in MPa.

3.4

resonance

The phenomenon, that the amplitude of a structure increases rapidly when the frequency of the periodic exciting force provided by an exciting force is close or equal to the inherent frequency of the system, is called resonance.

3.5

vibration mode

During resonance, the vibrating envelope lines of all mass points on the surface of a

structure, are vibration mode, including bent, twisted, distorted, clock vibration modes and drum vibration mode.

4 Selection of vibration stress relief device

When vibration stress is relieved on a welding structure, the vibration stress relief device used shall be as required by JB/T 5925.2 and have the following functions.

5.1 Parameter determination criteria

Under general conditions, the vibration parameters shall be determined by analyzing and estimating the possible vibration modes within the excitation frequency of a structure based on the working conditions of the welding structure.

5.2 Direct vibration

A structure can be vibrated directly within the excitation frequency range if responses can be excited.

5.2.1 Support of a structure

For the structure which can be vibrated directly, an elastic support and be placed at the node in accordance with the vibration mode obtained from analysis and estimation.

Support points can be two, three or four.

The support of special structures stable.

5.3 Indirect vibration

For a structure which cannot be vibrated directly, frequency reduction measures shall be taken. The main frequency reduction measures include cantilever, series connection and combination and so on.

5.4.1 General rules

When vibration stress relief is carried out for welding structures of other materials, first carry out an evaluation of similar materials and processes.

If the dimensions of a welding structure's defects exceed the limits or the constructions of a welding structure are designed inappropriately, vibration stress relief is not allowed.

5.4.5 Dynamic stress

The amplitude of dynamic stress shall achieve $1/3 \sim 2/3$ of the working stress of a structure.

6.1 Parameter curve observation method

The actual effects of vibration stress relief can be estimated in accordance with the changes of the a-t curve and the changes of the a-n curve before and after vibration, which are printed in real time during the process of vibration stress relief.

In one of the following cases, it can be decided that vibration stress relief is effective.

6.2.1 Residual stress measurement method

The blind hole relaxation method is recommended; the X-ray diffraction method can be used, or the magnetic method can be used if possible.

6.2.2 Dimensional accuracy stability test

The welding structures for vibration stress relief which are mainly subjected to dimensional stability testing, their dimensions shall be measured after vibration. The specific method of dimension testing shall be as follows.

Annex A

(Informative)

Description of applications of vibration stress relief

A.1 Vibration stress relief of other types of welding structures

This Standard prescribes a limit to the applicable scope of vibration stress relief, but the specifications of this Standard can be referred to for other types of joints or structures (e.g.. brazed structures using undermatching joints and diffusion welding structures) in vibration stress relief.

A.2 Stress concentration factor of welding joints

For the welding structures for which the vibration stress relief technique is used, select the types of joints which have a small stress concentration factor, which is generally not greater than 2.8. For the welding structures which have the welding joint design of