verified industrial maintenance solutions

Title: Motion Amplification Report 2020 – 6970

Client: CONFIDENCIAL

Asset: Sichter ZM 6 - 06ZM049

Prepared:

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Accepted:

Date: 23.12.2020

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Time

Date: 11th December 2020

Time: 7:00 until 15:00 – acquiring data at compressor site;

Location

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Purpose of the measurements

The purpose of the measurements is to control the operation of the Sichter ZM6 unit .

Scope

Vibration analysis during machine operation - visualization using the IRIS-M motion amplification camera. A series of recordings were made from different angles and for different parts of the unit, using different lenses, to highlight the most relevant information and analysis presented in this report. Several recorded films were rejected due to poor measuring conditions - platform vibrations of very high amplitude and dust in the air.

Hardware setting:

The IRIS-M motion amplification camera was used to visualize vibrations and deformations of the machine structure and supporting structures. Additionally, the screw connections were checked. Lenses with different focal lengths were used. Frequency filtering was used to visualize specific frequencies.

Hardware specification:

Motion Amplification system IRIS M;
Lenses: 6mm, 12,5mm, 25mm, 50mm, 100mm;
Sampling frequency: 700 fps;
Frequency range up to 200Hz for highest rotation speed;
Amplification factor: 1-500x;
Speed: from 1fps up to 4 times faster than natural speed
Dedicated LED lamp set ;

Conclusions and recommendations:

Separator and Cone:

Motion Amplification construction measurement showed a vibration of whole structure

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Figure 1. Measurement point of separator and cone structure.

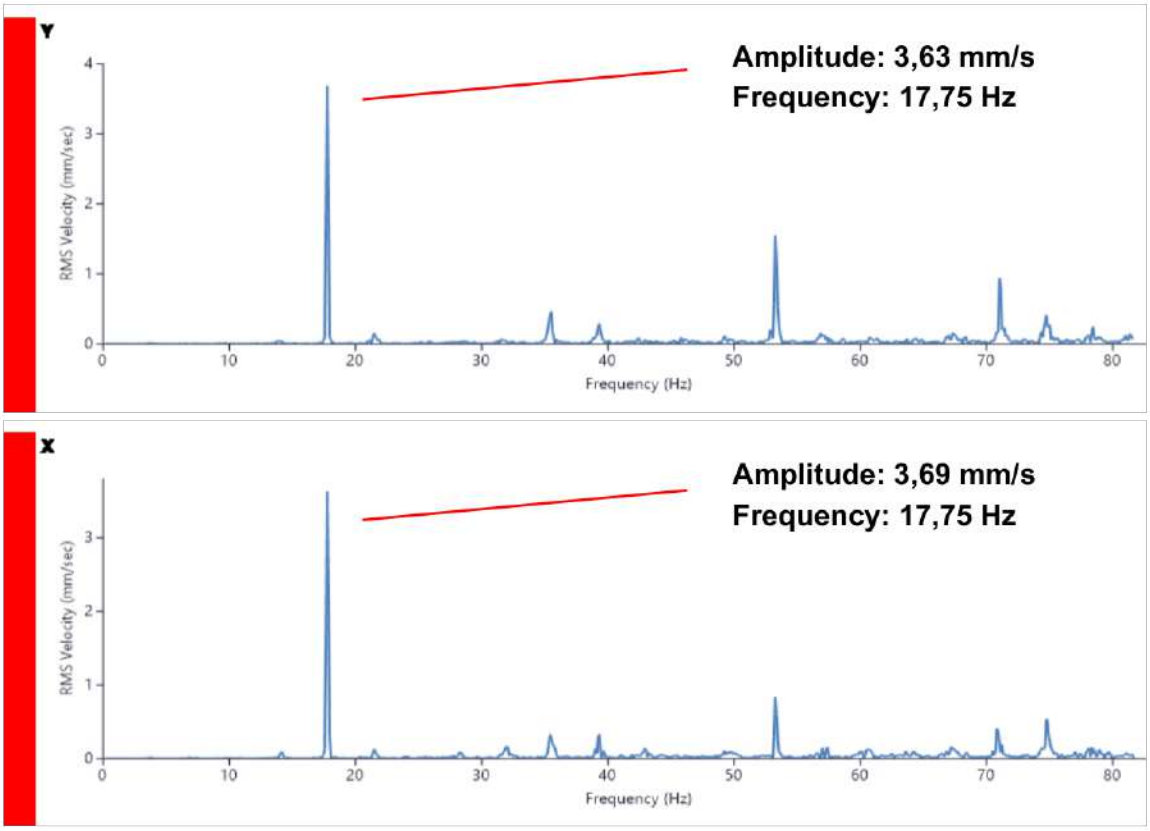

Figure 2. Spectrum at measurement point selected at figure 1.

Recommended inspection of fasteners every 0.5 years. In particular, platform mounts which are subject to deformations as a result of generated vibrations.

Motor and Gear:

Control of the drive system showed the dominant vibrations with a frequency of **21.33Hz**.

Figure 3. Measurement points of motor and angular gearbox unit.

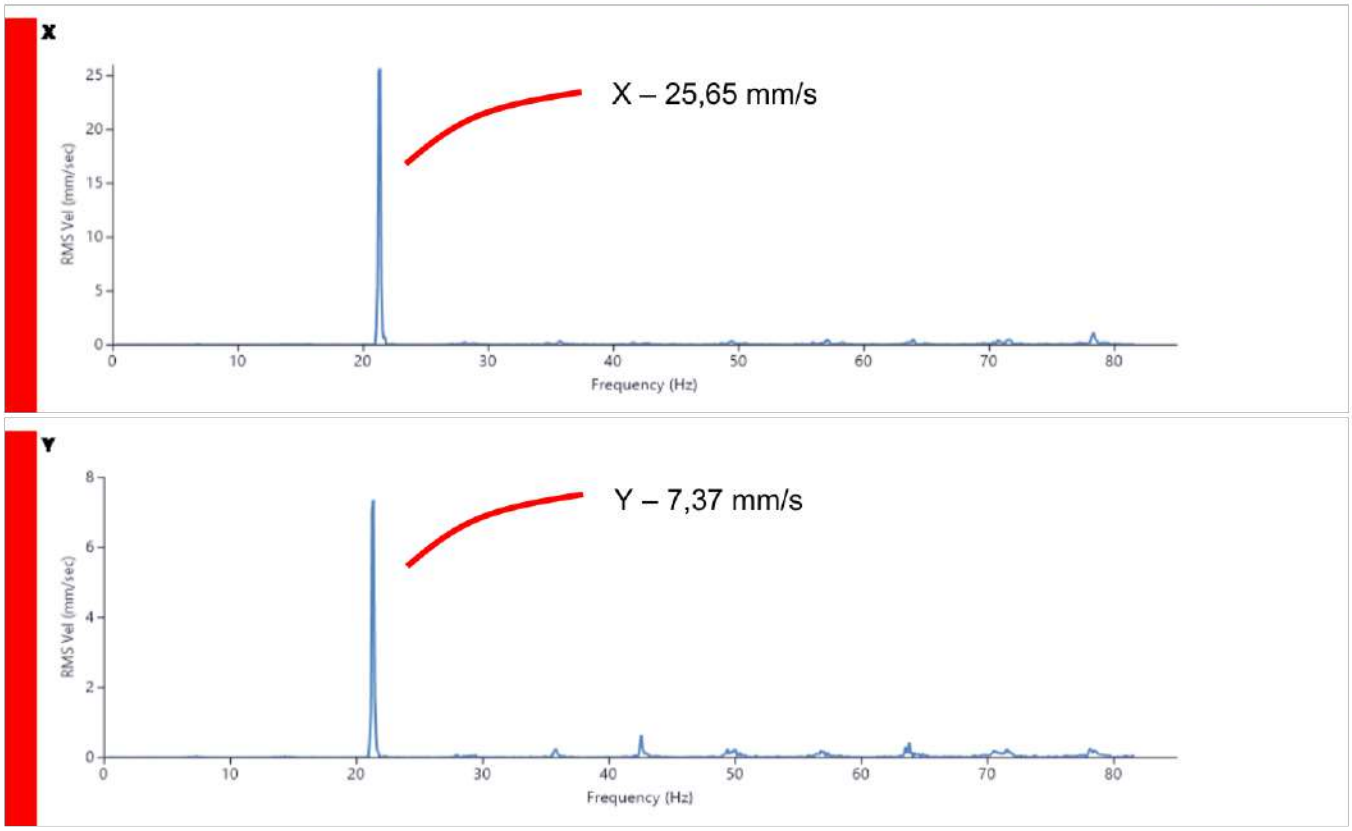

Figure 4. Spectrum diagram of red measurement point..

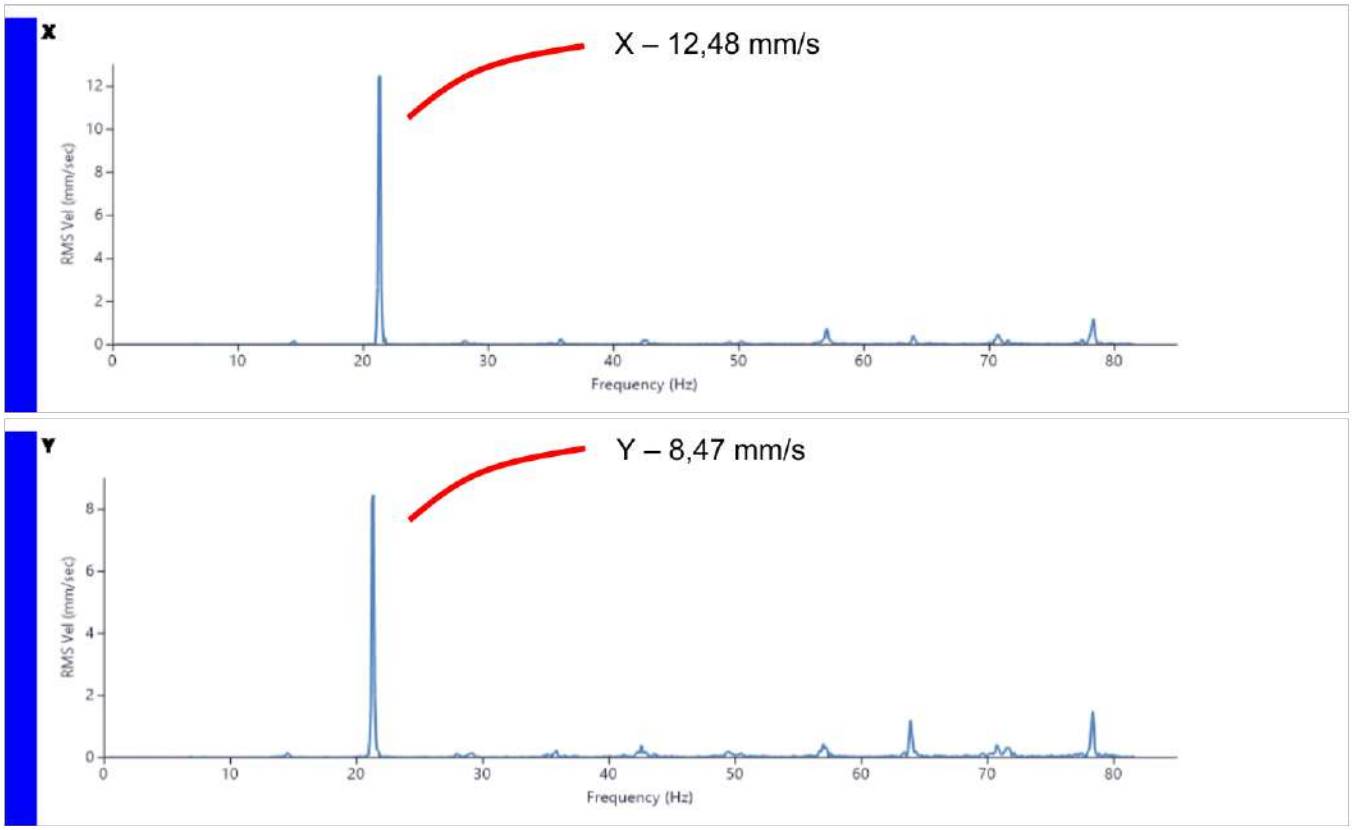

Figure 5. Spectrum diagram of blue measurement point..

Time waveform analysis showed work in the opposite phase of the drive system and transmission

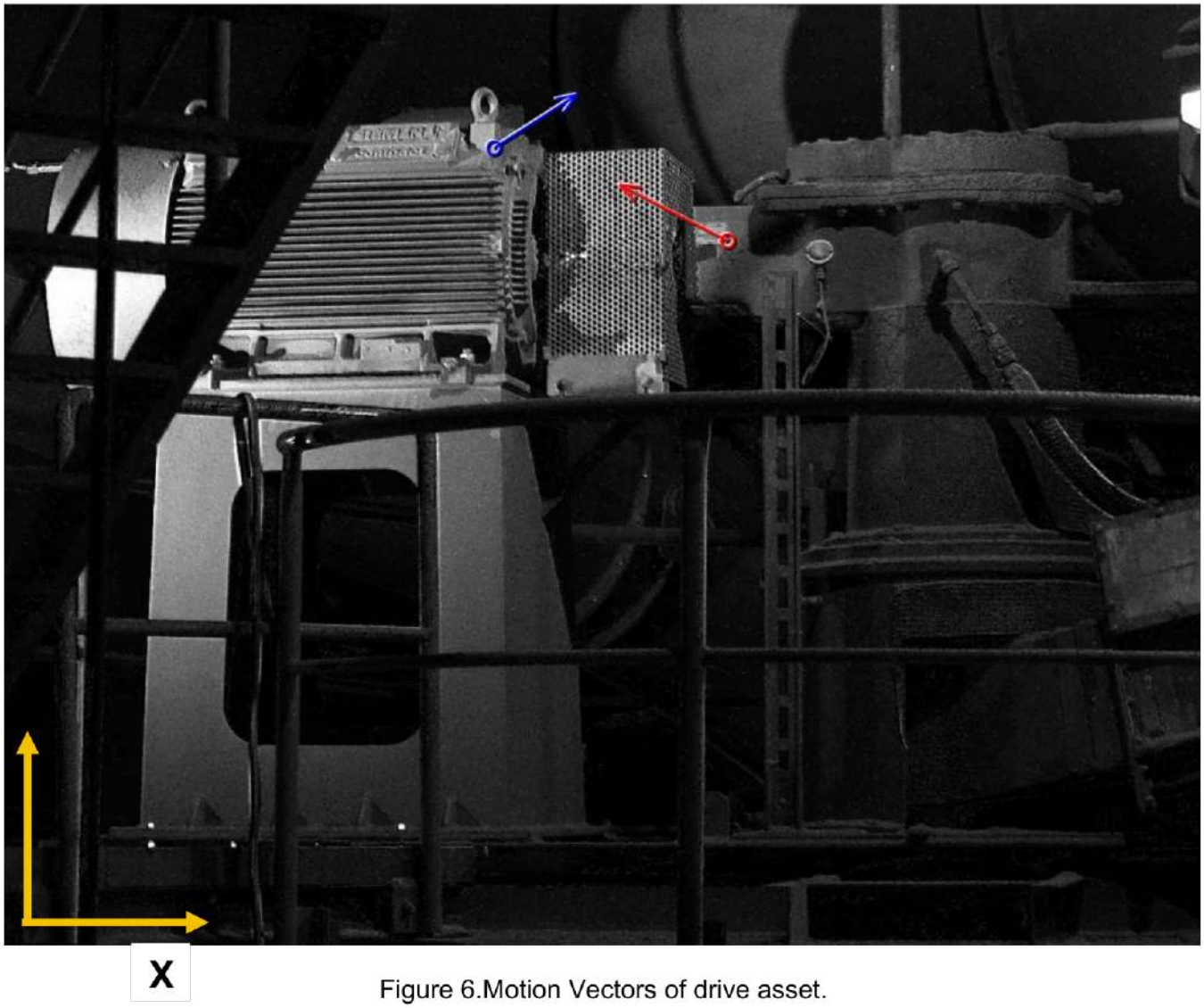

Figure 6.Motion Vectors of drive asset.

Pictures shows relation of vectors which are moving not paraller. Diagram below shows time waveform vibration at X direction of motor and gerbox which are runing out of phace.

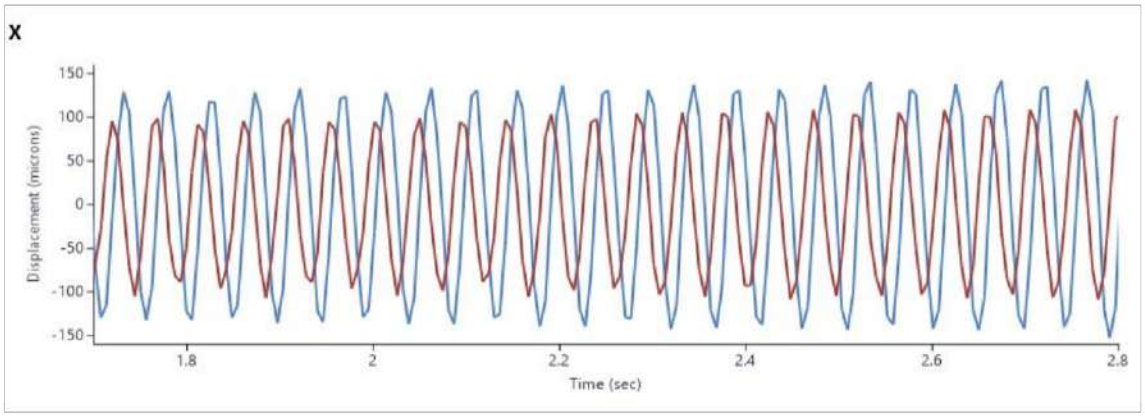

Figure 7. Time waveform of selected point from figure 6.

The orbit diagrams confirm the different nature of vibrations generated on the engine and transmission.

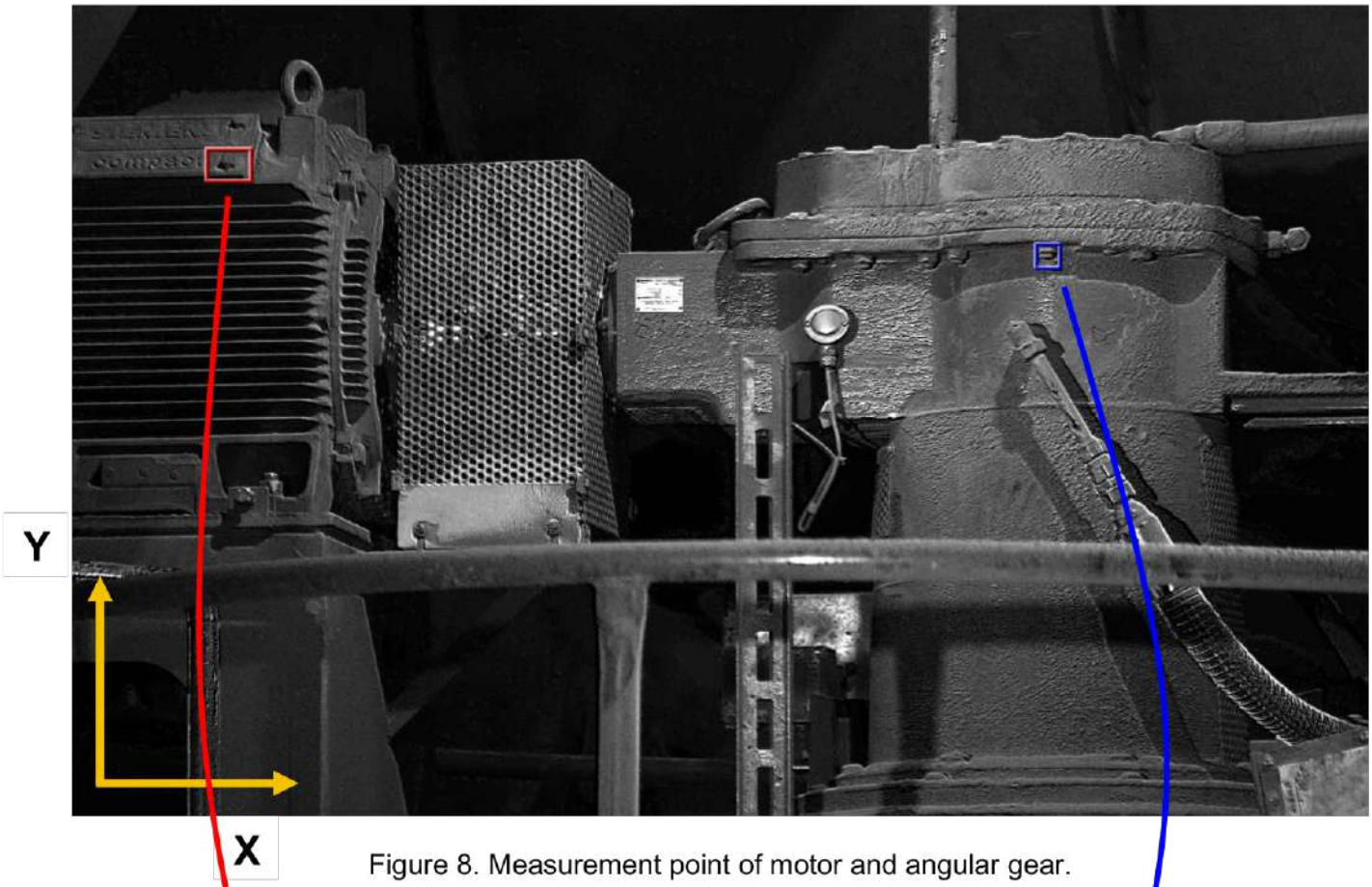

Figure 8. Measurement point of motor and angular gear.

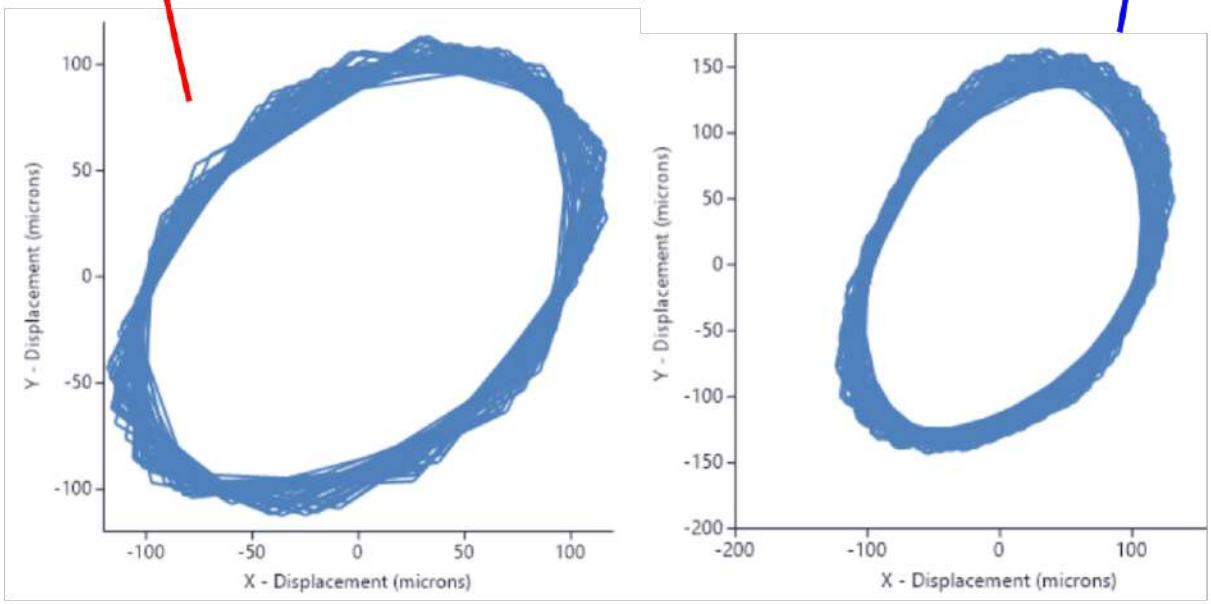

Figure 9. Orbit diagram of measurement point from figure 8.

During the measurements, deformations of the angular gear housing were observed, which may affect the unstable operation of the device and the misalignment of the system.

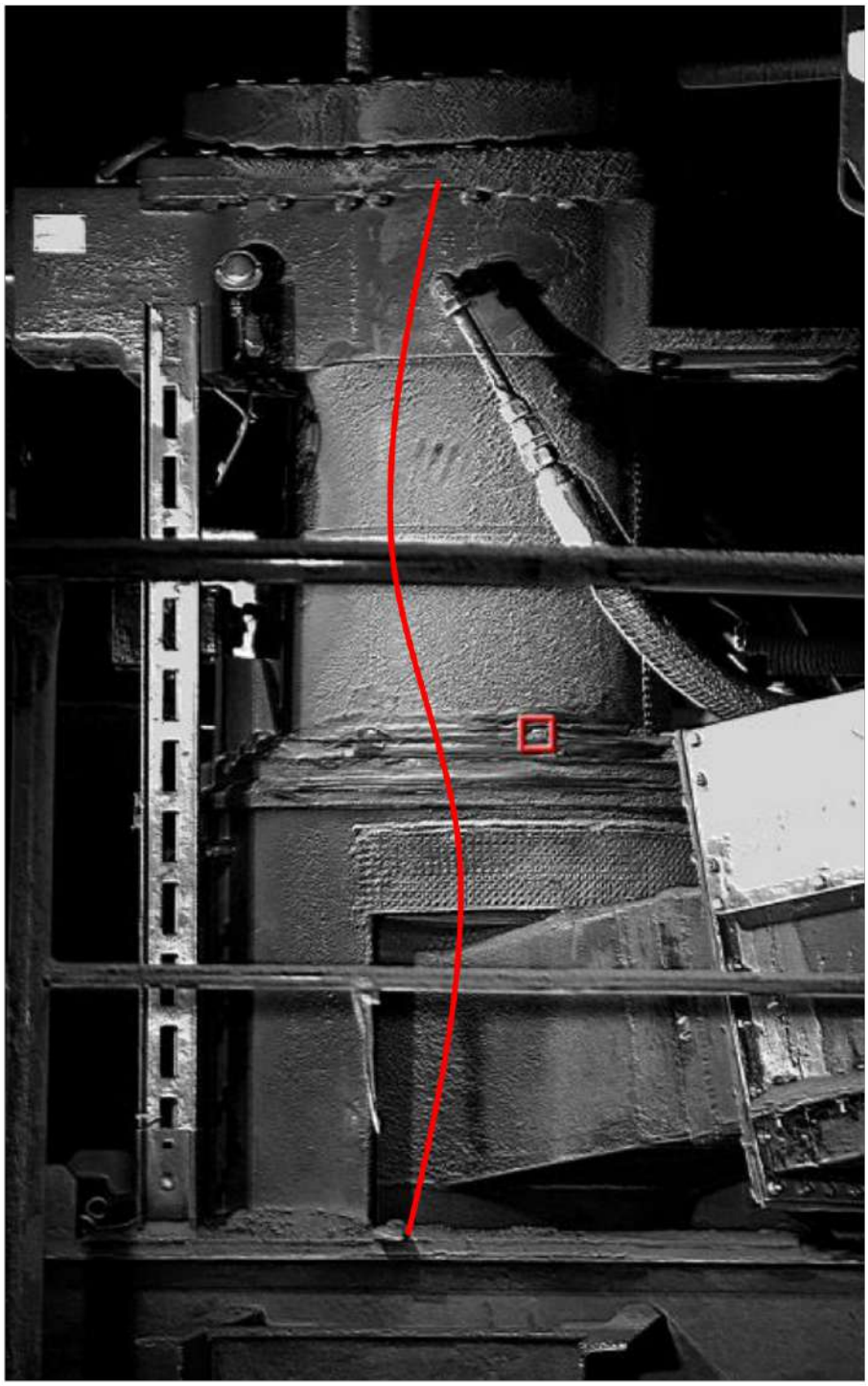

Figure 10. Angular gear housing deformation.

Vibrations of the pedestal on which the engine is placed were also observed. The films show deformation of the structure.

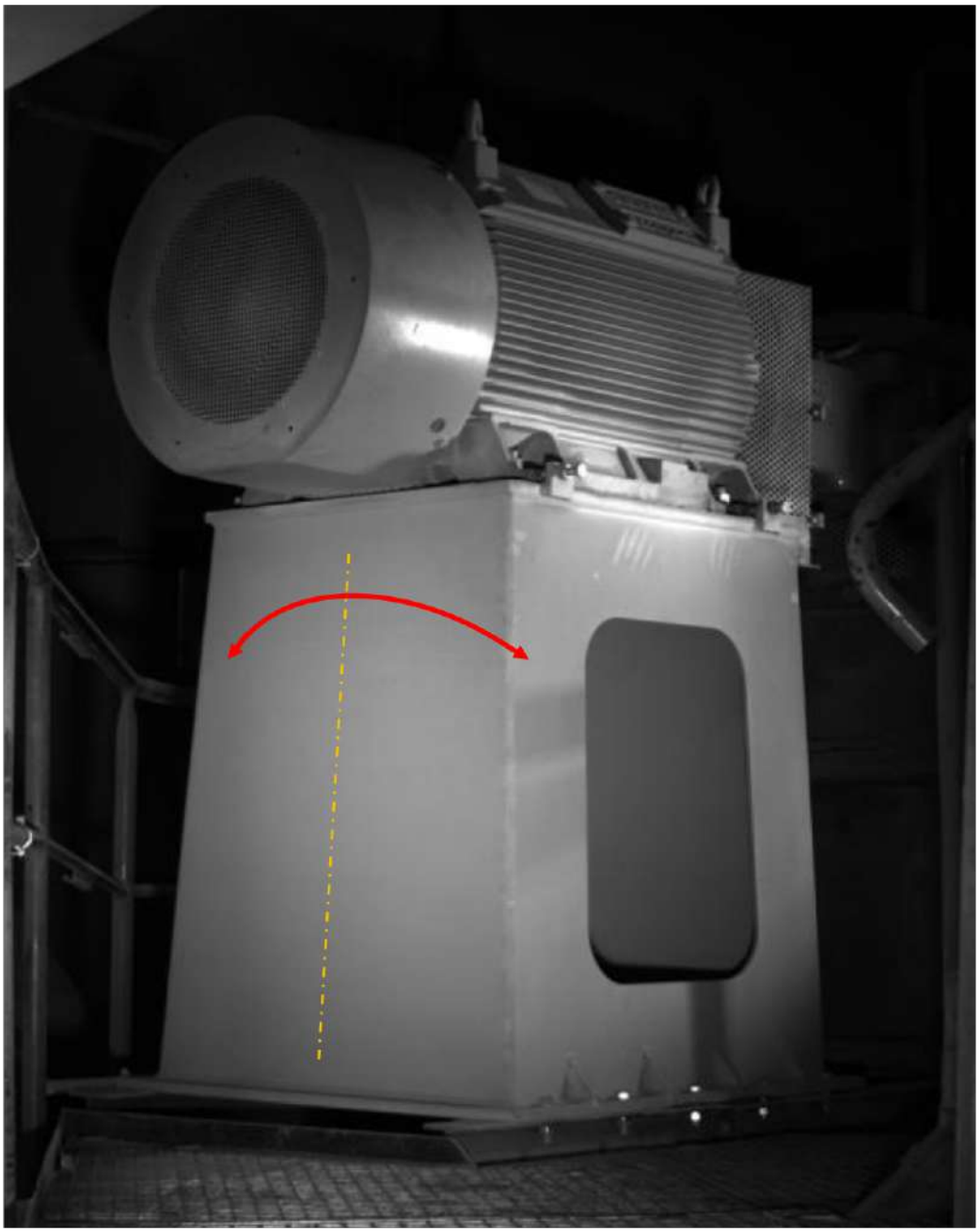

Figure 11. Vibration of motor support..

It is recommended to control the stiffness of the supporting motor and angular gear structure with different working load. In addition, consider strengthening the structure supporting the motor and the angular gear to stabilize the system during operation. Necessary to perform alignment.

The deformations and vibrations are best observed by watching recorded movies.

Download video files here:

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