CASE STUDY-Pump Room Noise & Vibration Mitigation

The Client was able to reduce vibrations and noise transmission to the structure to acceptable levels , while Reverberation within the pump room was significantly controlled, leading to improved comfort for the client and enhanced operational efficiency in a quieter, more functional adjacent workspace.

THE BACK GROUND

The client's project which is a high-end residential development with critical mechanical systems installed, including multiple pump headers essential for water circulation. The challenge presented to Kinetics Group was to address significant vibration transmission from the pump headers to the above floors. Such vibrations, if left uncontrolled, could lead to noise disturbance for the occupants, reduced system efficiency, and potential structural stress.

Additionally excessive noise levels from the domestic pump area were affecting the adjacent receiver room, leading to discomfort and operational concerns for the client. The primary challenge was to design and implement a vibration and noise control solution that would effectively reduce sound levels and reverberation within the pump room, there by preventing noise and transmission to surrounding areas.

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THE CHALLENGE

Vibration emanating from the pump headers and elbows posed a significant challenge for the clients. The mechanical vibrations were not only causing discomfort for the occupants on the floors above but were also leading to long-term operational inefficiencies and potential maintenance issues. The client needed an effective solution to isolate and mitigate the vibrations without interrupting the mechanical flow and structural integrity of the system.

Similarly the pump room was generating significant noise due to the operation of domestic pumps. The noise levels were not only creating an uncomfortable environment but also causing noise bleed into adjacent spaces, particularly the receiver room. The client required a solution that would not only mitigate the noise but also ensure compliance with acoustic performance standards, without compromising the pump room's functionality.

AT A GLANCE

Location	Dubai, UAE
Kinetics Group Solutions	Noise & Vibration solutions
Turnaround Days	21 Days from Inception to handover

SOLUTION 1

Kinetics proposed a comprehensive solution incorporating Kinetics Spring Hangers model SH(figure A) and FLS Vibration Isolators(Figure B). These solutions were carefully selected to mitigate vibration transmission and ensure mechanical stability.

Kinetics Spring Hangers: These spring-based hangers were installed on the pump headers to absorb and isolate the mechanical vibrations generated during the pump's operation. Kinetics SH Spring Hangers feature resilient springs capable of minimizing the transfer of vibratory energy, ensuring effective decoupling of the mechanical system from the building structure.

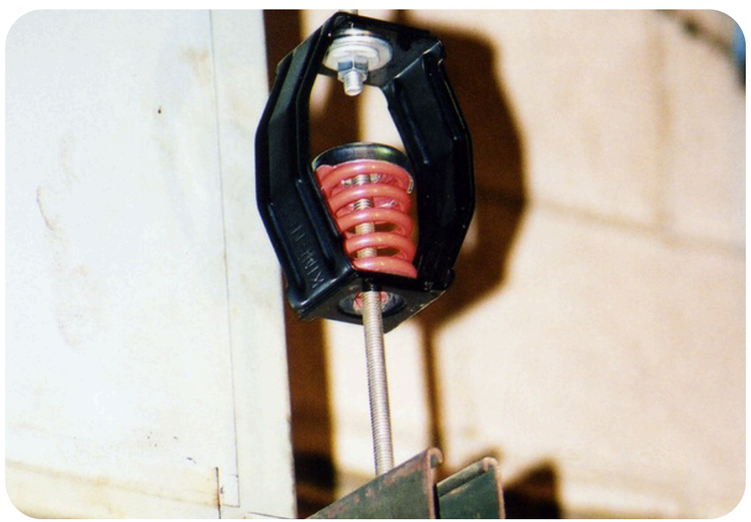

Figure A

Kinetics Vibration Isolators: Installed at support locations along the pump headers and elbows, these FLS isolators(Figure, B) played a crucial role in mitigating vibration transmission to the floors below. Engineered for high-performance vibration isolation, these products also prevent structural resonance and reduce the impact of pump operation on adjacent spaces

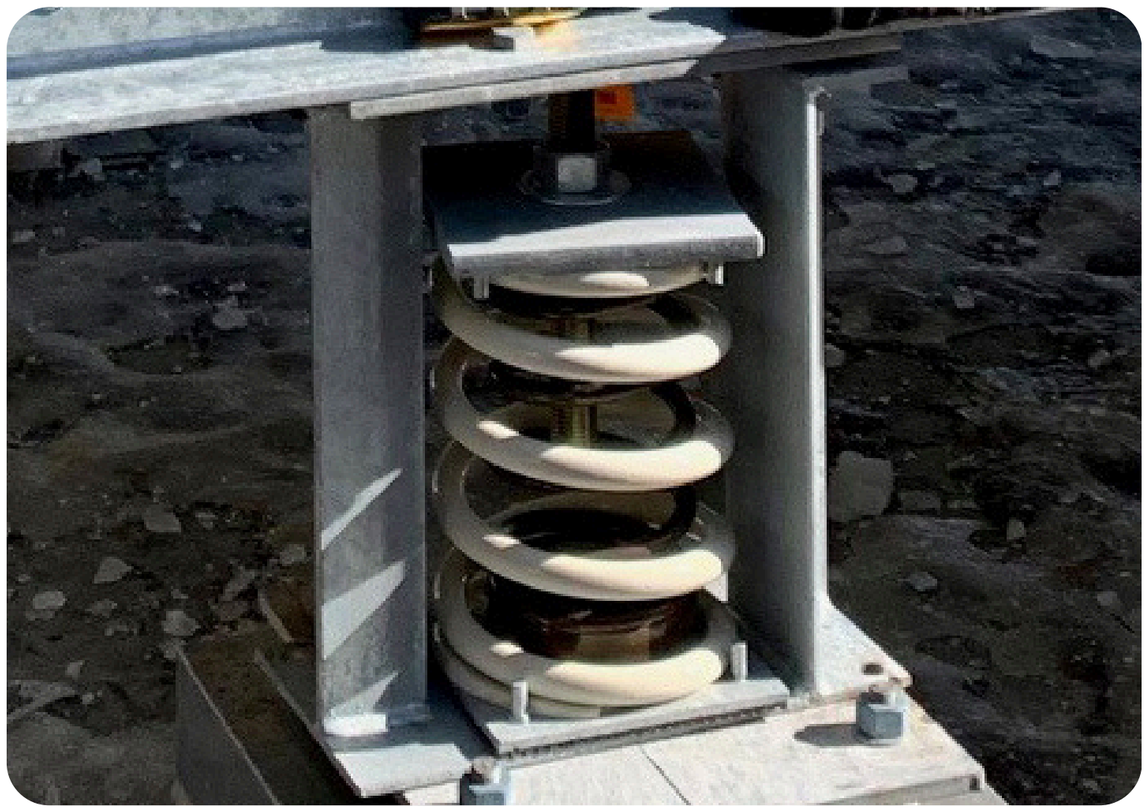

Figure B

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THE EXECUTION OF SOLUTION 1

The execution phase involved the installation of Kinetics Spring Hangers and Vibration Isolators at specific points of vulnerability, particularly on the pump headers and elbows. Kinetics engineers conducted a thorough analysis of the vibration levels and strategically positioned the isolators to maximize effectiveness. The installation was executed without disrupting the ongoing construction and ensured compatibility with the existing mechanical systems.

RESULTS

- Vibration Reduction: Post-installation, vibration transmission to the above floors was reduced by approximately 60%, significantly improving the comfort of the occupants.

- Operational Efficiency: The system's operational noise levels decreased significntly, contributing to a quieter and more efficient working environment within the building.

- Structural Protection: The solution not only mitigated vibrations but also safeguarded the building structure from potential long-term damage caused by continuous vibration exposure.

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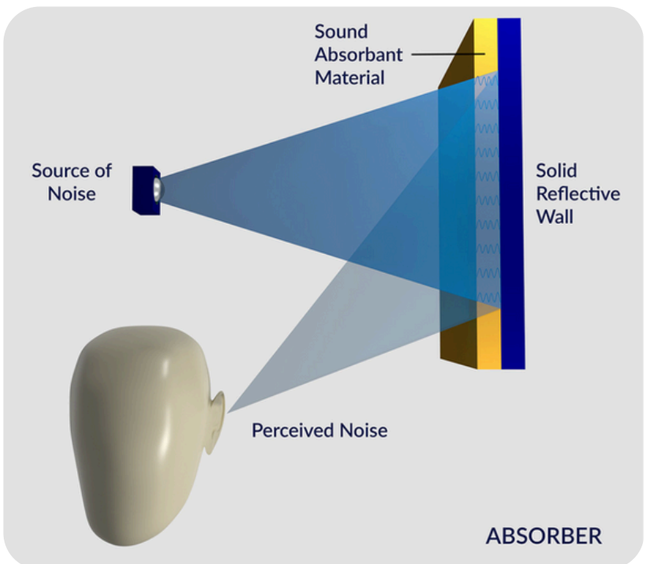
SOLUTION 2

To address the noise and reverberation issues within the pump room, Kinetics Group proposed the installation of Kinsorb Acoustic Polyester Panels(Figure C), a highly effective solution designed for noise absorption and reverberation control. These panels are engineered to absorb airborne noise, making them ideal for pump rooms and other mechanical spaces where noise levels are a concern.

Figure c

Proposed Acoustic Treatment:

- Kinsorb Acoustic Polyester Panels were recommended for their superior sound absorption qualities. The panels were installed on the walls and ceilings of the pump room, strategically placed to target the primary sources of noise.
- Reverberation Reduction: The panels were designed to control and reduce reverberation by absorbing the sound waves bouncing off the hard surfaces, creating a quieter and more manageable environment within the pump room.



- Noise Mitigation to Adjacent Spaces: By treating the pump room with Kinsorb panels, we aimed to limit the transmission of noise to the adjacent receiver room, ensuring a significant reduction in noise levels.

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THE EXECUTION OF SOLUTION 2

Kinetics Group's experienced engineering and installation team carefully designed and implemented the acoustic treatment within the pump room. The installation involved:

- Site Inspection: Detailed analysis of the pump room’s layout and noise sources to determine optimal placement of the Kinsorb panels.
- Precise Installation: The acoustic panels were installed across the walls and ceiling, covering key reflective surfaces to maximize sound absorption and reduce noise leakage.
- System Testing and Optimization: Post-installation, noise measurements were conducted to assess the effectiveness of the solution and ensure compliance with the project’s acoustic performance standards.

RESULTS

Following the installation of the Kinsorb Acoustic Polyester Panels, the noise levels in the adjacent receiver room were significantly reduced. The reverberation within the pump room was controlled, creating a quieter and more efficient operational environment.

Key Results:

- Noise Reduction: The noise levels transmitted to the adjacent room were reduced significantly, resulting in a more comfortable environment for the client.
- Reverberation Control: The installation of Kinsorb panels effectively reduced reverberation within the pump room, contributing to better sound management and less overall noise.
- Improved Operational Efficiency: With the noise issue resolved, the client experienced improved operational conditions within the building, ensuring a quieter and more functional workspace.

CONCLUSION

- By implementing Kinetics tailored advanced solutions, the client effectively resolved vibration issues, creating a quiet, comfortable, and a structurally sound environment for residents.
- Kinetics addressed the noise problem by using Kinsorb Acoustic Polyester Panels in a customized solution, which not only met but exceeded the client's expectations, significantly reducing noise transmission to nearby areas.

This project demonstrates Kinetics Group's commitment to providing high-performance noise and vibration control solutions that are specifically tailored to meet the unique requirements of each project.

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