ALFEM

- THE MACHINE DOCTOR -

ACOUSTICS, VIBRATION & DYNAMICS

ALFEM is a specialised technical engineering and management consultancy, offering a broad range of professional services. ALFEM provides Acoustics, Vibration and various Dynamic engineering services to buildings, urban developments, marine, energy, transport and petrochemical markets. ALFEM brings together professionals with a deep passion for engineering and problem-solving. Integrating this passion with hands-on technical expertise to meet our clients requirements is what sets ALFEM apart.

SPECIALIST SERVICES

ACOUSTICS

- Architectural Acoustics
- Industrial Noise Control
- Environment Noise Control
- Marine Noise Control
- Noise Monitoring

VIBRATION

- Vibration Design & Analysis
- Industrial Vibration Control
- Shaft Power/Torsional Vibration
- Vibration Condition Monitoring (VCM)

DYNAMICS

- Computational Fluid Dynamics (CFD)
- Finite Element Analysis (FEA)
- Pipe Stress Analysis
- Testing & Commissioning

Acoustics

Architectural Acoustics

ALFEM understands the fundamental impact acoustics have on people's lives. With the use of advanced computing techniques, ALFEM works closely with the clients to achieve the desired acoustic environment with our innovative and creative solutions.

Industrial Noise Control

Industrial noise is generally considered an environmental health and safety issue. The proper design of noise control treatments at the design stage for mechanical systems is therefore important in ensuring occupational safety and health. ALFEM's experience in various heavy industries enables us to work closely with our clients to ensure that human noise safety levels are met, as well as to ensure that noise within the development do not become a nuisance to the surrounding.

Environment Noise Control

With universal concern about environmental issues, there is an increasing emphasis on Environmental Acoustics. ALFEM has the expertise in conducting traffic noise impact assessments for residential, commercial and institutional projects, highlighting noise issues right from the onset at the design stage. ALFEM is able to provide predictive noise assessments and effective noise control treatments that optimise cost-effective construction and operating solutions.

Vibration Design & Analysis

Excessive vibrations are often considered undesirable as they often result in discomfort, energy wastage as well as creating unwanted noise. These vibrations can be the result of imbalances of rotating parts, uneven wear due to friction, gear meshing, improper selection of isolation or simply resonance. ALFEM is able to assist in the design and selection of the isolation system for the mechanical systems by considering the various factors. Where vibration occurs in existing systems, ALFEM is able to conduct detailed vibration analysis to determine the source of vibration as well as the early detection of possible mechanical failure. This allows the problems to the rectified before an expensive failure occurs.

Industrial Vibration Control

Industrial Vibration Control refers to the control of vibration in industrial situation or equipment, preventing implications such as mechanical failure, malfunctioning, or noise problems. It is commonly conducted in tandem with a vibration condition monitoring program.




Dynamics

Computational Fluid Dynamics (CFD)

With the use of advanced Computational Fluid Dynamics (CFD) softwares, ALFEM is able to assist in the study of the dynamics of fluid flow. Applications of CFD include wind engineering studies for building performance designs; pedestrian comfort analysis; internal & external airflow studies for thermal comfort and natural ventilation; as well as the analysis of complex fluid flow and mixture. Through the analysis of results, one can then gain a deeper understanding of the design, performance and the resilience to predicted situations. This allows refinements to be made to the design to obtain optimum performance and result.

Finite Element Analysis (FEA)

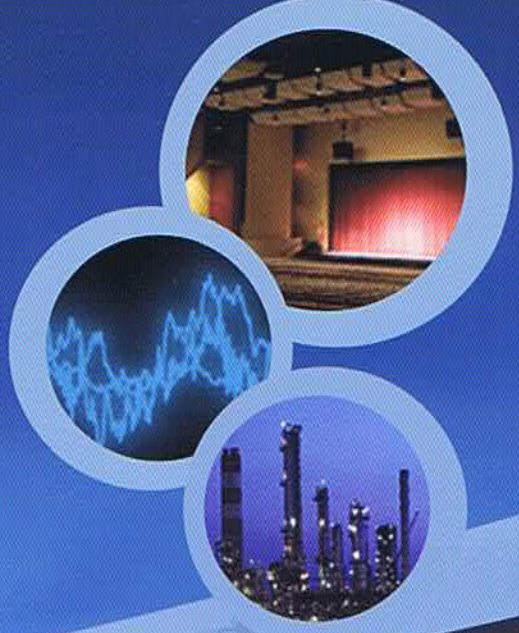
Finite Element Analysis (FEA) allows a complex structure to be broken down into many small elements, where the stresses and deformation of each element can be solved by known equations of elasticity. FEA allows detailed visualisation of bending and twisting in structures and highlights the distribution of stresses and displacements. FEA allows designs to be constructed, refined and optimised before the design is manufactured, resulting in greater product reliability and quality.

Marine Noise Control

ALFEM's extensive experience in the marine and offshore industry ensures that vessels and offshore platforms meet the stringent noise and vibration requirements of the various classification bodies. ALFEM's specialist services include preliminary structural and mechanical noise prediction studies as well as troubleshooting for onboard mechanical equipments. Commissioning measurements are also conducted to ensure compliance with requirements of classification bodies. These services can be conducted either at dockside or during sea trials.

Noise Monitoring

Regular and reliable monitoring of noise and their sources is important for accurate noise assessments and interpretations. ALFEM provides noise monitoring services to new and existing developments to ensure compliance to local standards and requirements. Noise monitoring is also able to determine the effect the external climate has on the development.



Vibration

Shaft Power/Torsional Vibration

All rotating machinery systems experience some degree of torsional oscillation during starting and continuous operation. The torsional vibration response of rotating machinery is thus an important consideration in determining the reliability of the rotating system. Through the use of advanced software and equipment, ALFEM is able to conduct a torsional response analysis of the system to determine the presence of torsional resonance. ALFEM is also able to conduct on-site vibration analysis as well as measurements to determine critical speeds, torsional stresses as well as shaft powers of rotating equipments.

Vibration Condition Monitoring (VCM)

Vibration condition monitoring (VCM) refers to the process whereby vibration data of a machine is monitored on a regular basis in order to establish a trend, and thereby, key symptoms of mechanical faults such as imbalance, misalignment, looseness and bearing faults etc. can be easily identified, corrected and prevented. With VCM, ALFEM helps ensures that equipments are working at their optimum efficiency, and this translates to savings in operation cost and improvements in energy efficiency.

Pipe Stress Analysis

Pipe Stress analysis examines the static and dynamic loading on a piping system, resulting from the effects of temperature change, internal and external pressures, gravity and settlement, changes in fluid flow rate and seismic activity, and ensures that the requirements of the relevant piping codes are met. The analysis helps ensure the safety of the piping system and the components, as well as the equipments that are connected to the system. ALFEM can assist in verifying that the routing, nozzle loads, hangers and supports are correctly selected and located such that the allowable stress is not exceeded under various loading conditions.

Testing & Commissioning

ALFEM has the capability and expertise to carry out various in-situ measurements. These include noise and vibration measurements and analysis, torsional vibration analysis, and shaft power measurements. ALFEM also has the ability and experience in conducting various external environment measurements for human comfort, in the areas of noise, vibration, indoor climate and lightings.