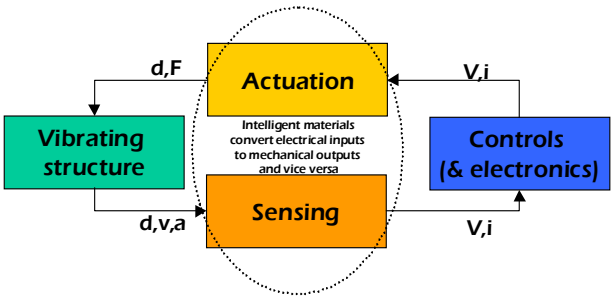
Smart Materials in Car Racing

Approach

Vibration-X has extensive knowledge in applying smart materials in several industries including automotive racing. Advancements in materials and technologies often provide the leading edge between a winning and a loosing team. Smart materials combine the mechanical and the electronic world by their coupling properties. Vibration-X can help you implementing these technologies to a wide variety of application. Our dedicated engineering team can provide analysis, testing and prototyping of the most sophisticated technologies. Our partnership with high volume manufacturers also allows us to provide you with a cost effective quality product.



Vibration-X Capabilities

Either internally or through our technology partners we can provide you with the following expertise:

Design and implementation

Actuators (piezoelectric, shape memory alloys, ER/MR fluids)
Sensors (strain, displacement, velocity, acceleration, pressure)
Electronics (linear and switching amplifiers, audio components)

Analysis

CAD/CAM (Pro/E, SolidWorks, SolidEdge, etc.)
Finite element analysis (Algor, Ansys, FEMAP, Nastran, etc.)
Boundary element analysis
Proprietary material property development

Testing

Anechoic chamber
On-site vibration testing
Acoustics testing
Durability testing

Manufacturing

Rapid prototyping
High volume production

Piezoelectric

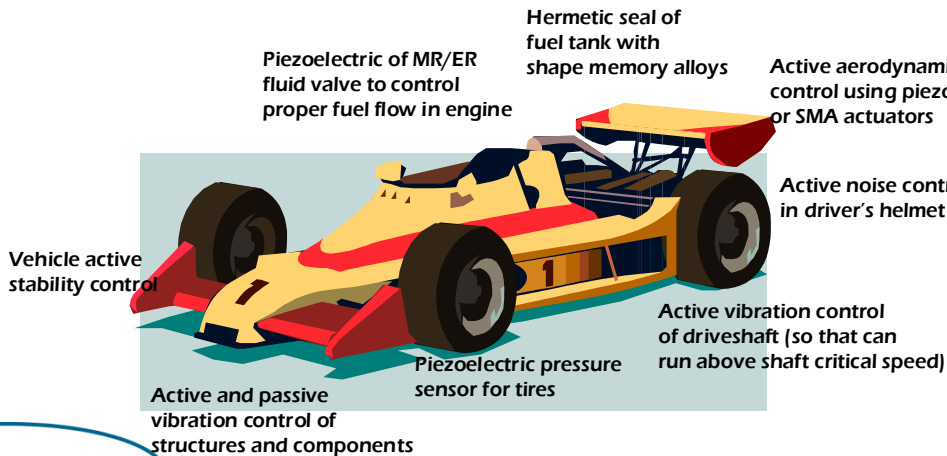
- Most commonly used
- Temperature independent
- Available in fiber, ceramic and crystal
- Good for dynamic conditions (>1Hz)
- High force can be achieved with a stack
- Fast response (<1 msec)

Shape memory alloys

- Large stroke can be achieved
- Highly temperature dependent
- Relatively inexpensive (in wire format)
- Good for DC conditions (<1Hz)
- Slow response (>1 msec)

ER/MR fluids

- Typically employed in isolators or valves
- MR fluids are more stable than ER fluids
- Low voltage power needed for MR fluids
- High yield stress
- Designed and contained in a device
- Have been implemented in automotive



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