

Innovation Days Efficient Dynamics. Innovative Acoustic Concepts.

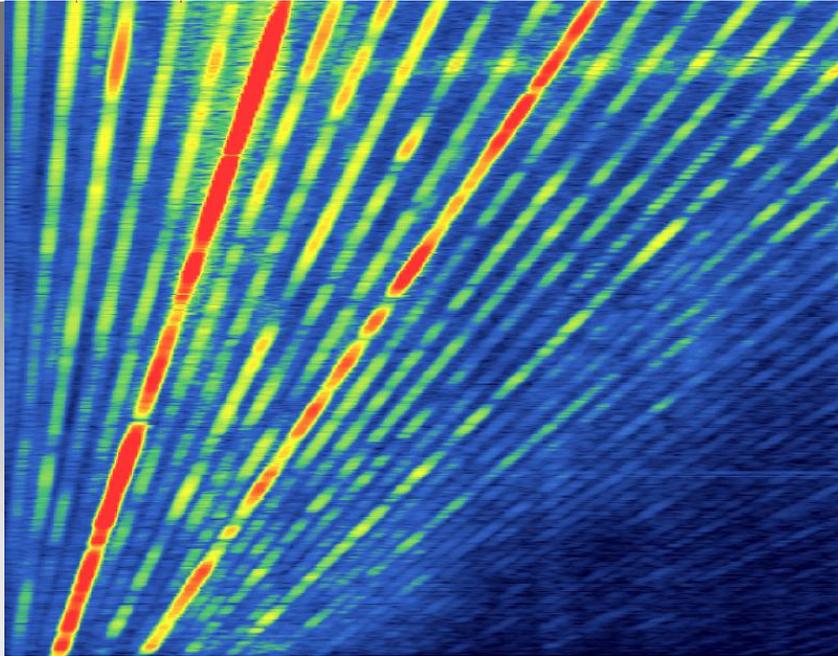


BMW Group



Innovation Days Efficient Dynamics.

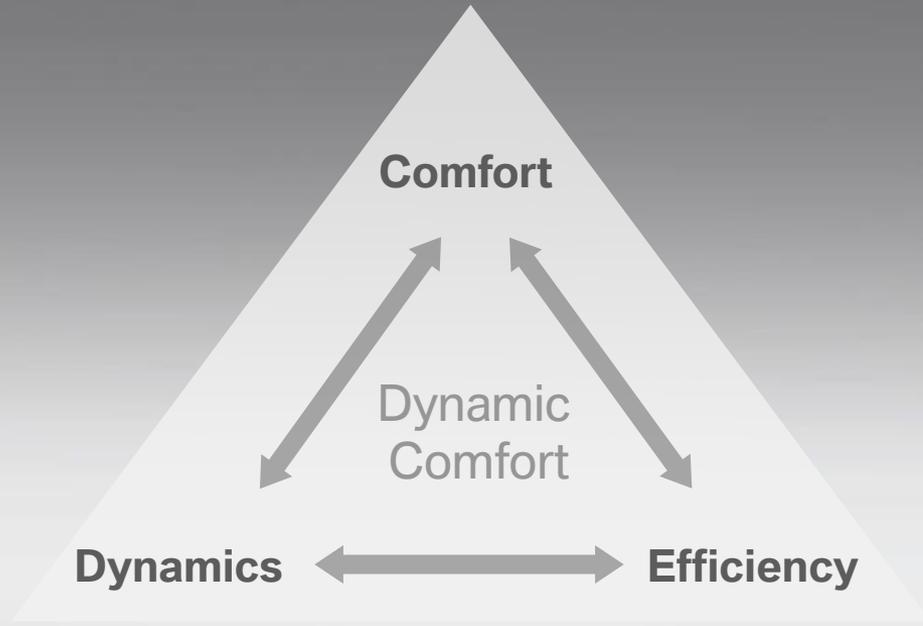
Innovative Acoustic Concepts.



**Intelligent Acoustic
Lightweight Design**

Active Acoustic Systems

Innovative Acoustic Concepts. The Challenges.



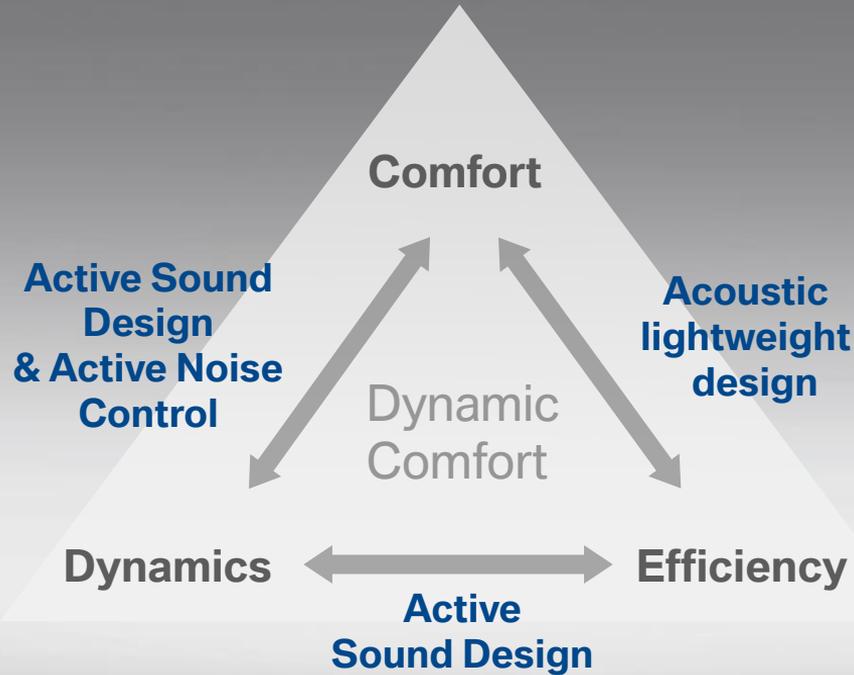
Traditionally:
conflicting objectives difficult to resolve

Efficiency vs. comfort: additional efficiency frequently comes with a less attractive sound performance

Efficiency vs. dynamics: fuel-efficient technologies often detract from a sporty engine sound

Comfort vs. dynamics: traditional mass damping measures (to improve comfort) increase inertia and reduce the sense of effortless dynamics

Innovative Acoustic Concepts. Solutions.



Acoustic lightweight design

- integrated system-level approach (source and transmission path) and extensive use of acoustically efficient components
- Efficient integration of acoustic functions into other components

Active acoustic systems

- Active design of engine sound for an enhanced dynamic experience
- Sporty and dynamic diesel sound
- Active noise control offers an efficient way of supporting acoustic lightweight design concepts

Intelligent Lightweight Concepts.

Functional Integration Creates Added Value.



Despite an additional heat shield and 20% larger surface area, the BMW 7 Series underbody is approximately 40% lighter than that of its predecessor

Functional integration creates benefits:

Reduced exterior noise

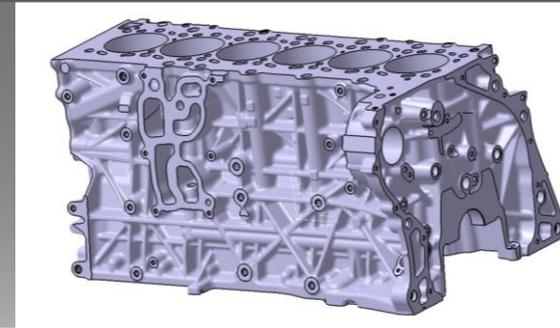
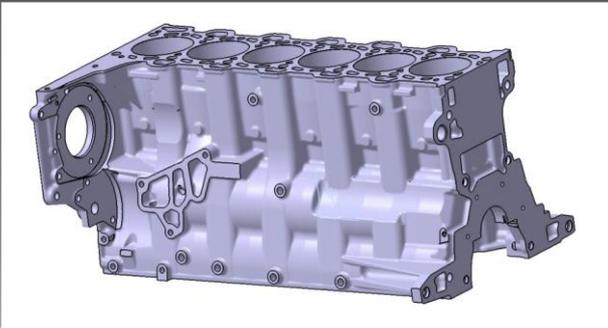
Reduced interior noise

Improved body protection

Greater efficiency through improved aerodynamics and thermal management

Intelligent Lightweight Concepts.

Synthesis of Lightweight Materials and Acoustically Efficient Design.



Example:
crankcase

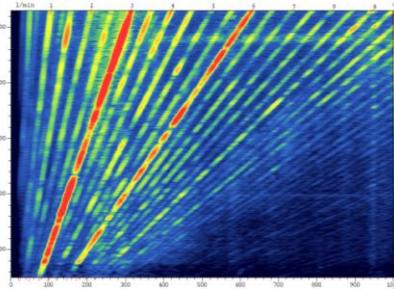
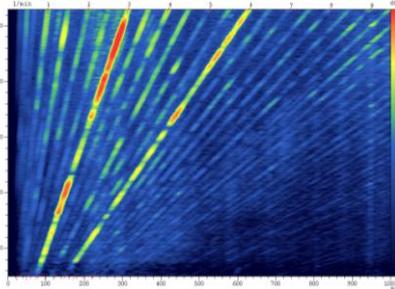
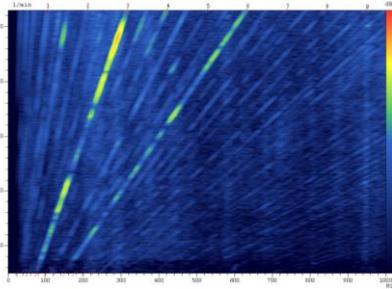
Present: Cast iron

High mass, stiffness and damping reduces surface vibration, resulting in good acoustic performance

Innovative: Finned aluminium construction

- Lightweight design
- Finned design compensates for lower mass
- High stiffness
- Highly efficient to improve acoustics

Active Acoustic Systems. Custom-tuned Engine Sound.



Sound 1:
comfort-biased

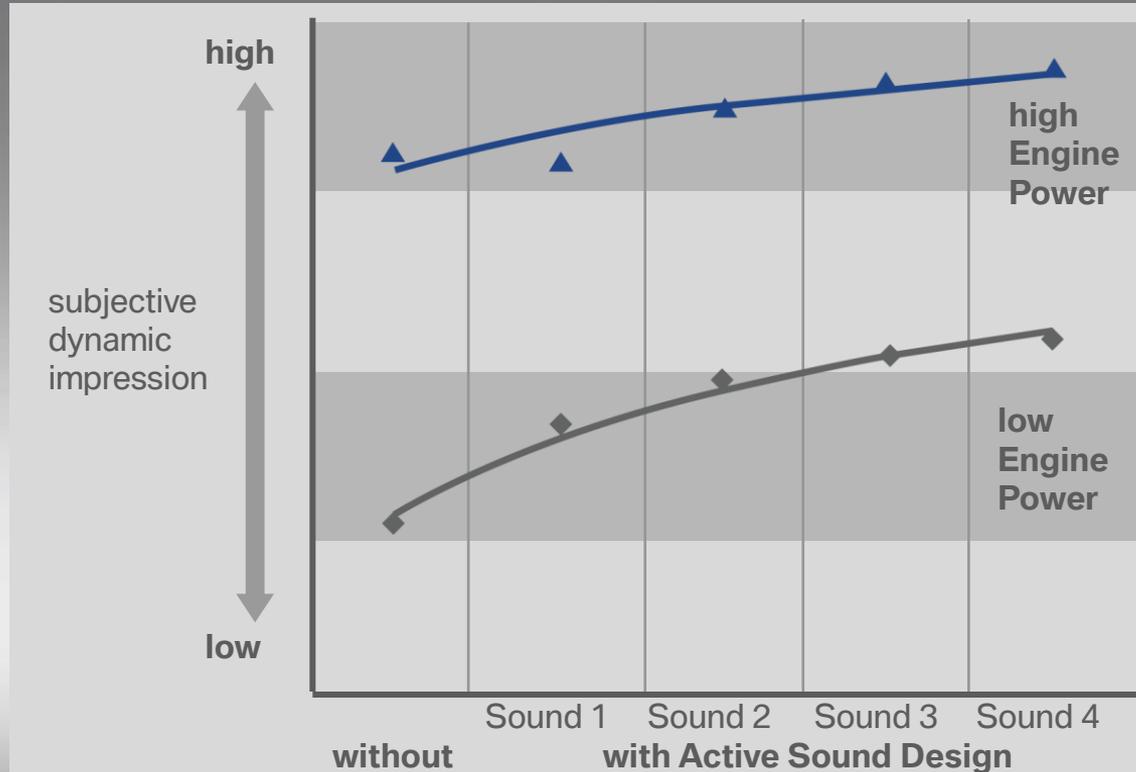
Sound 2:
dynamic-comfort

Sound 3:
dynamic-biased

With Active Sound Design, the engine sound
can be perfectly fitted to the character of the car.

Active Acoustic Systems.

More Dynamic Experience for the Same Engine Power.

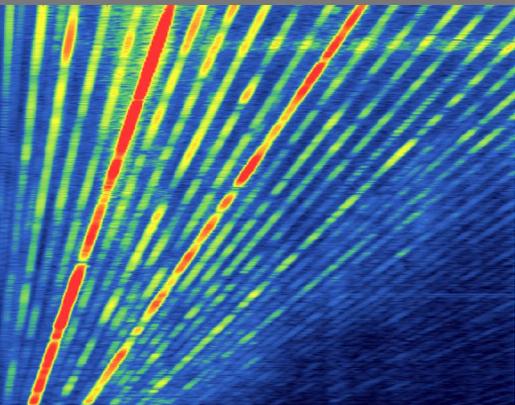


Test series:

- Blind test with 25 test subjects, no acoustics experts
- Sounds tested in random order

Active Acoustic Systems.

Study of a BMW 6 Series Sport Diesel.



The new sound.
Difficult to describe.
A test drive will reveal more.



Innovative Acoustic Concepts.
Thank You for Your Attention.

