

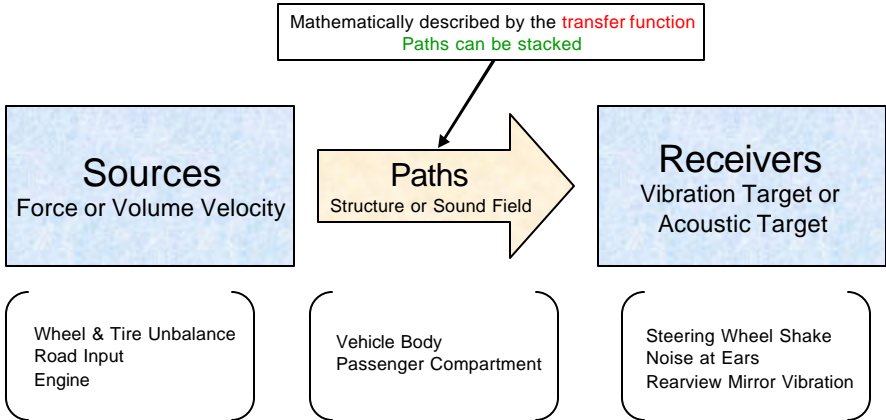
Transfer Path Analysis

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Transfer Path Analysis Basic Principles



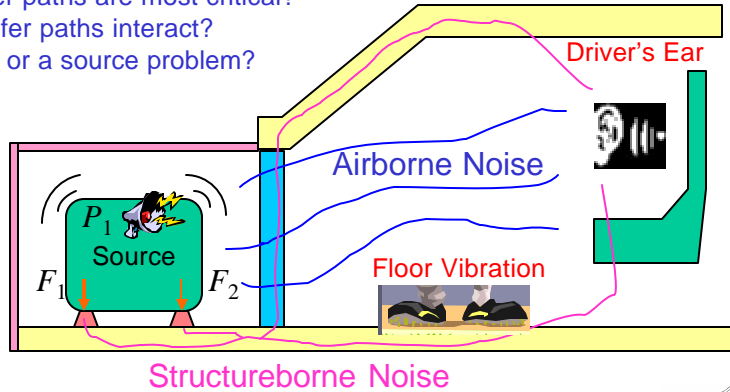
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Transfer Path Analysis

Purpose

- Which inputs are important?
- Which transfer paths are most critical?
- How do transfer paths interact?
- Is it a system or a source problem?



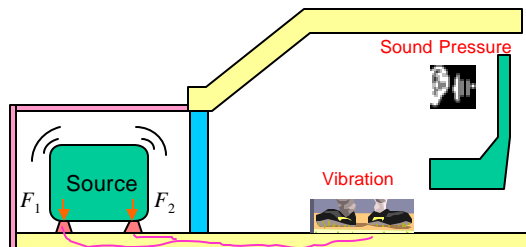
Transfer Path Analysis

$$v_t = \sum v_{\text{partial}} = \sum F_i \cdot H_{t/i}$$

Partial Vibration

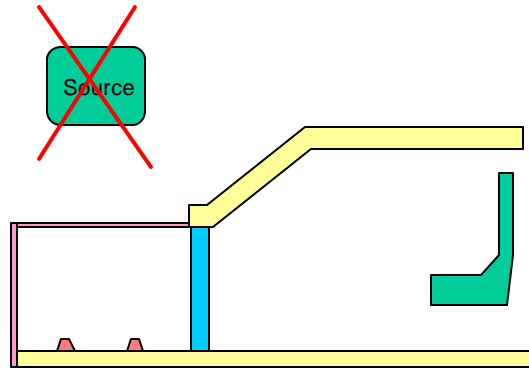
$$P_t = \sum P_{\text{partial}} = \sum F_i \cdot H_{t/i}$$

Partial Pressures



TPA Step 1 - Remove the Source

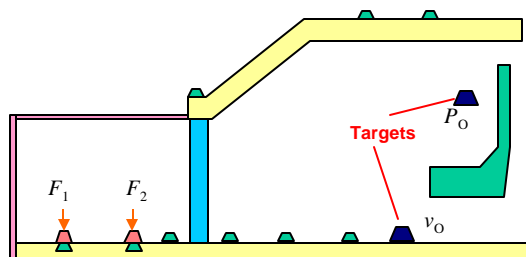
- ❖ May need to use several input positions for continuous mountings



TPA Step 2 - Indicator/Target Positions

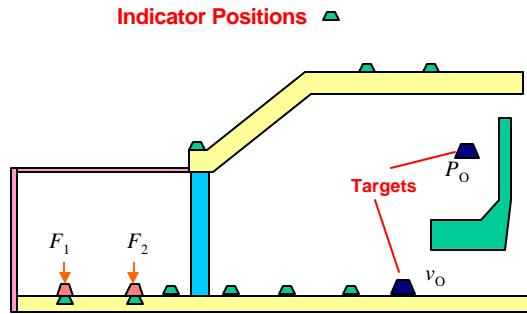
- ❖ Suggest choosing the point where the force is applied
- ❖ Spread indicator positions along paths towards targets
- ❖ If you have N mounts, use $3N$ indicator positions

Indicator Positions ▲

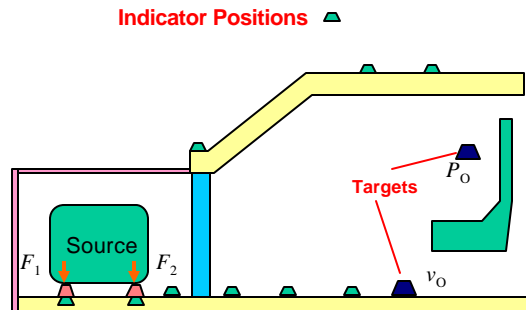


TPA Step 3 - Measure Transfer Functions

- ❖ Indicator Positions / Inputs (engine mounts)
- ❖ Targets / Inputs



TPA Step 4 - Measure Operating Conditions



TPA Step 5 - Analysis

❖ Determine unknown forces

$$\{F_{op}\} = [H_{I.P./Inputs}]^{-1} \{I_{op}\}$$

Operating Forces (Unknown) Indicator Position Accelerations (Step 4)

❖ As a check predict target responses

$$\{T_{op}\} = [H_{Targets/Input}] \{F_{op}\}$$

Targets (Unknown) (Step 4)

