



Principles of Dynamic Data Collection

Grounding Practices



Noise

Grounding & Shielding

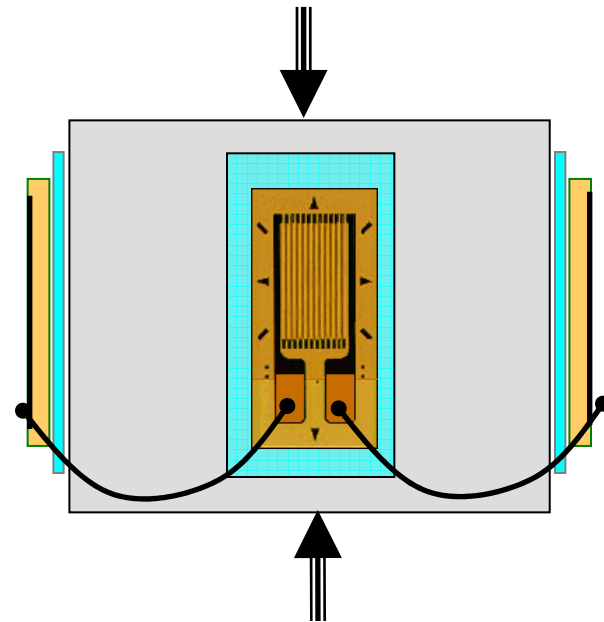
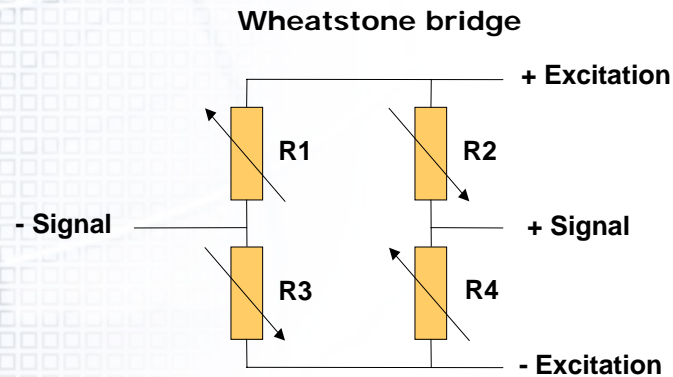
Practical Advice

- Ground all DAS equipment and power supply enclosures
- Shield the sensor cables
 - Allows stray EMI/RFI energy to terminate and drain to the TDAS case before influencing the signal wiring
 - Do not connect the shield at both ends. This could cause large ground-loop currents.
- Ground test dummies
 - Use large wires between all isolated conductive parts
 - Connect the entire dummy to the vehicle or sled structures and the DAS enclosures.
- Carefully consider routing and design of cables that carry high current signals to air bags, cameras, lights, etc.
 - Route these cables away from sensor wiring
 - Cross sensor wiring at 90° angles



Sensor Properties

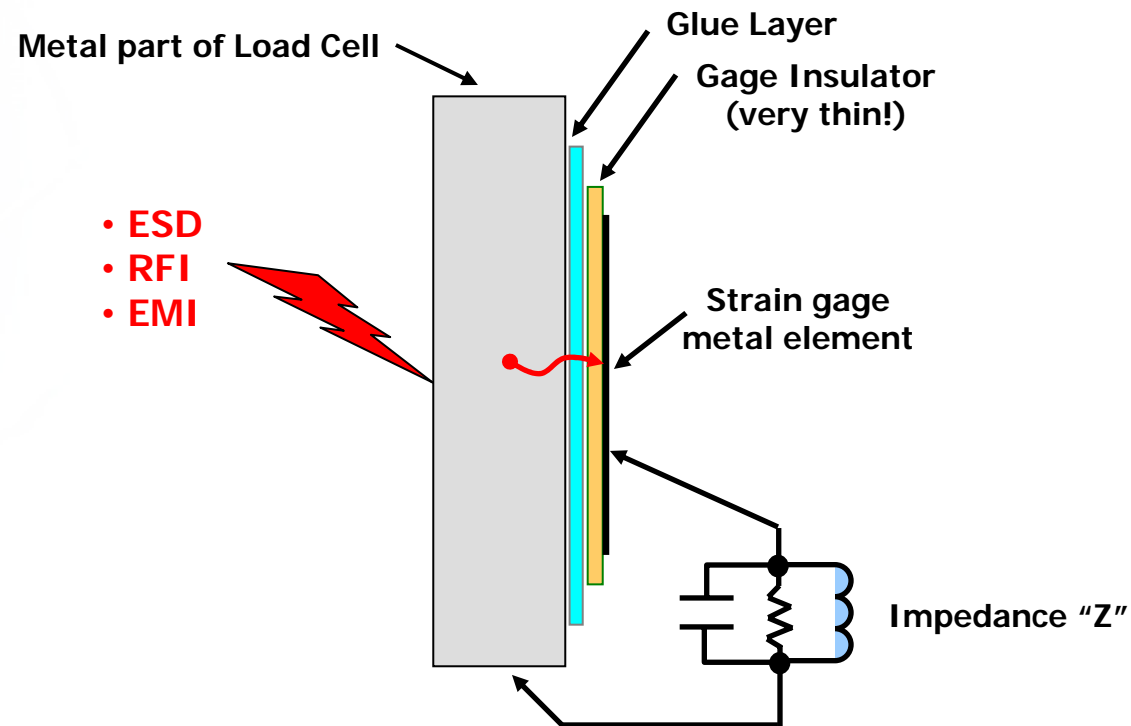
Typical Load Cell Design (Internal) (Similar for most crash test sensors)





Sensor Properties

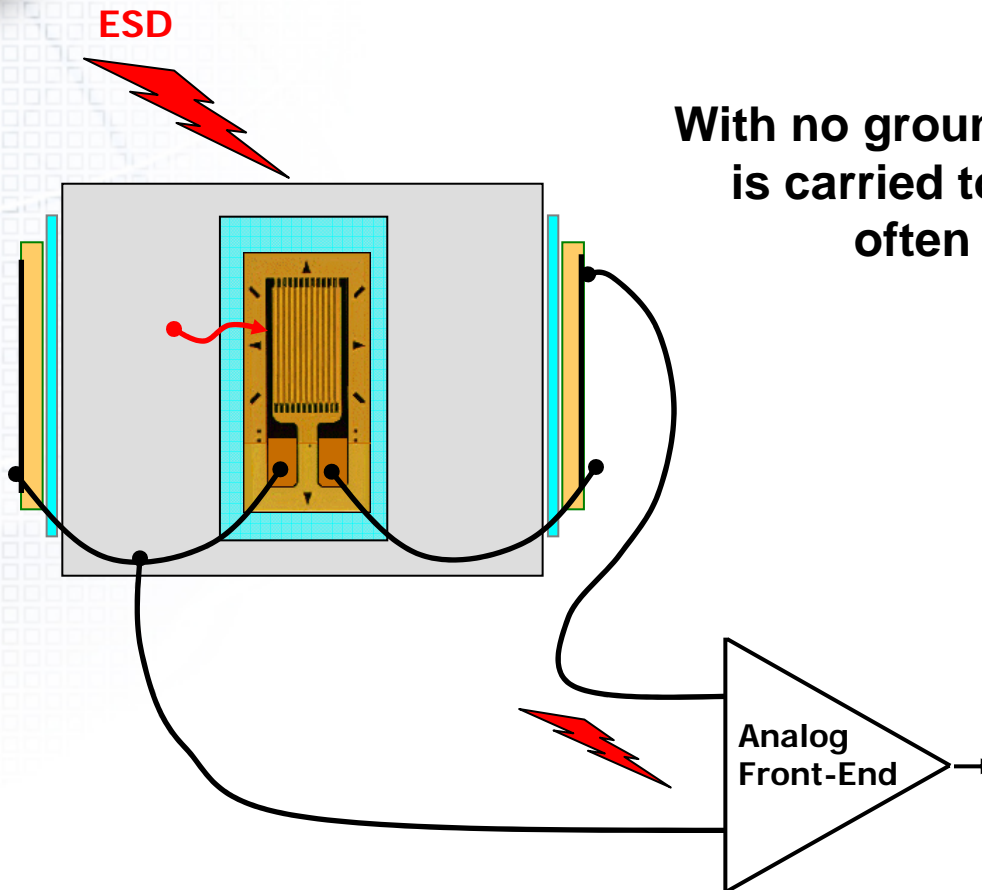
Electrical Coupling Between Transducer Metal and Strain Gage Elements





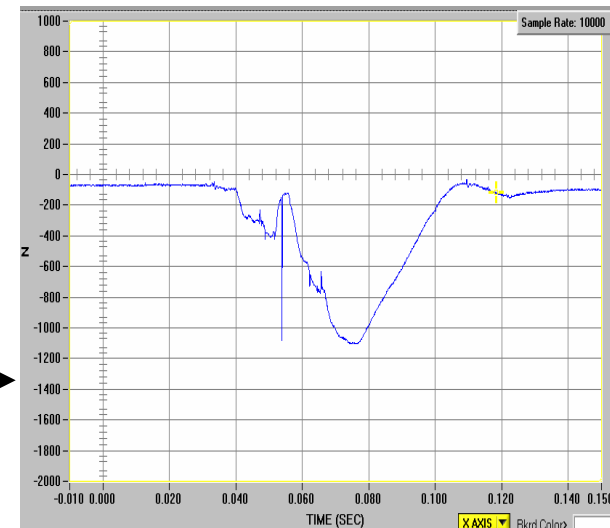
Sensors and ESD

ESD event with no grounding path for Load Cell



With no ground wire, significant energy is carried to the DAS sensor input, often affecting the data.

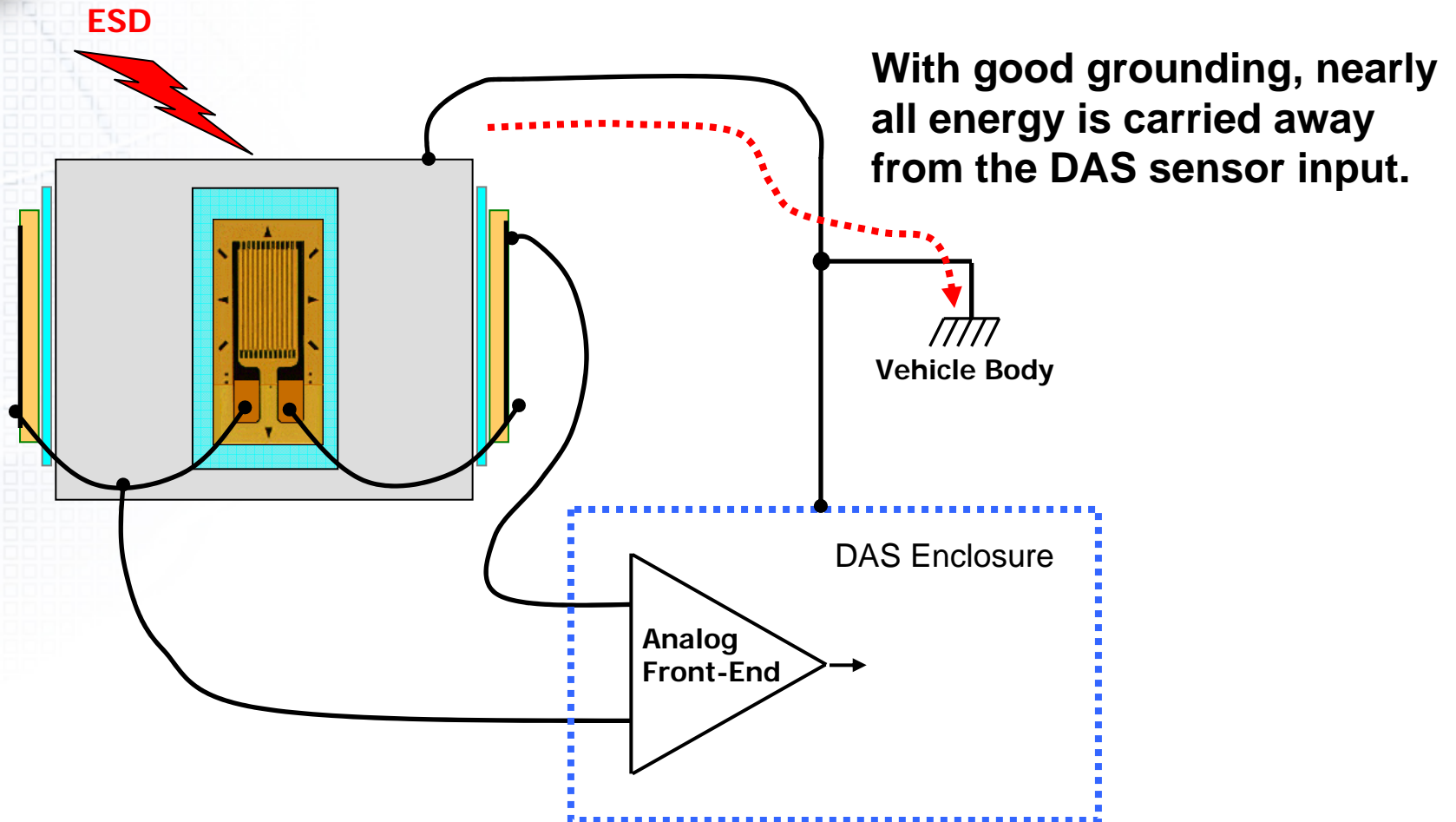
Neck data from test FSM5003





Sensors and ESD

ESD event with good grounding path for Load Cell



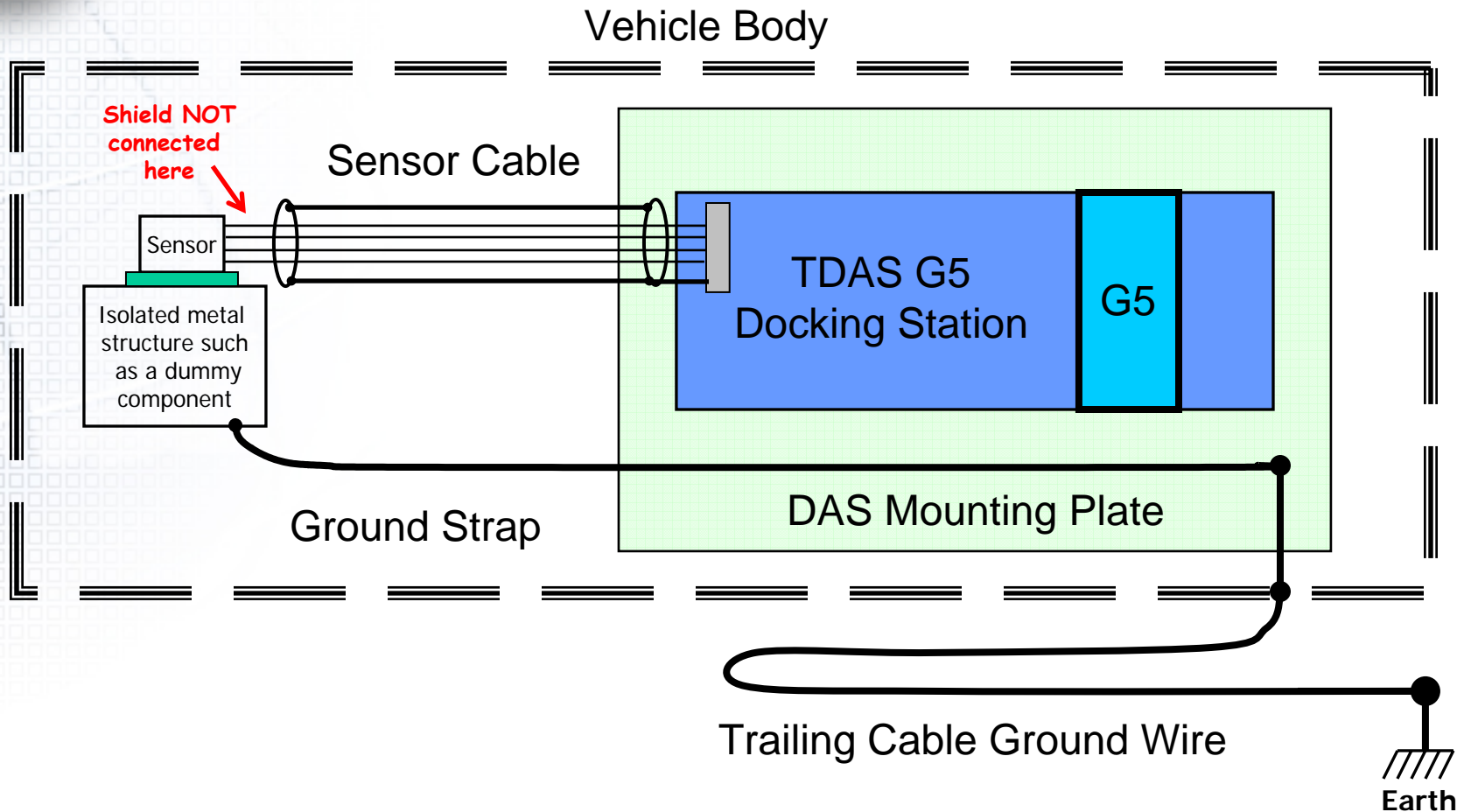


ESD and Noise Protection Strategy

Test device grounding practices



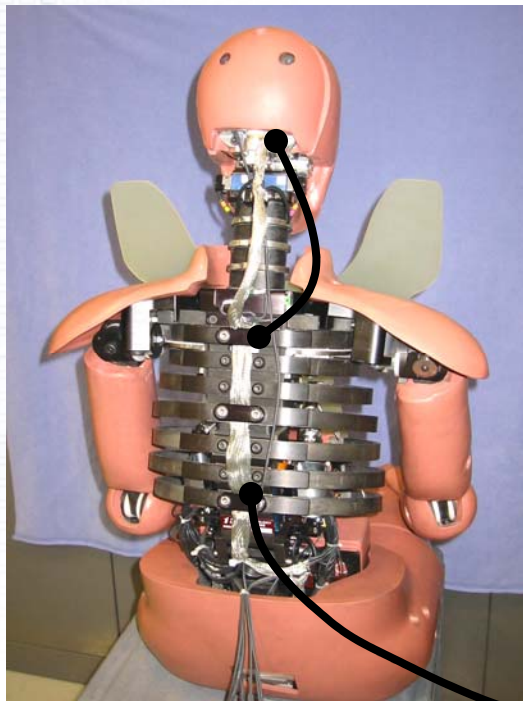
Recommended Grounding



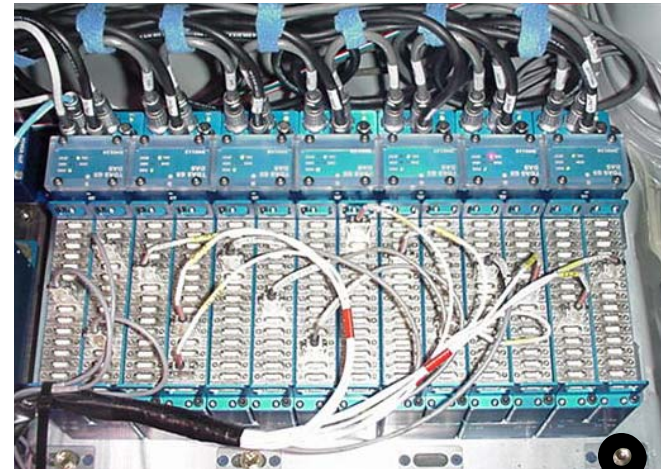


Recommended Grounding

- All instrumented dummy parts connected together



- Confirm solid connection between DAS plate and vehicle body.

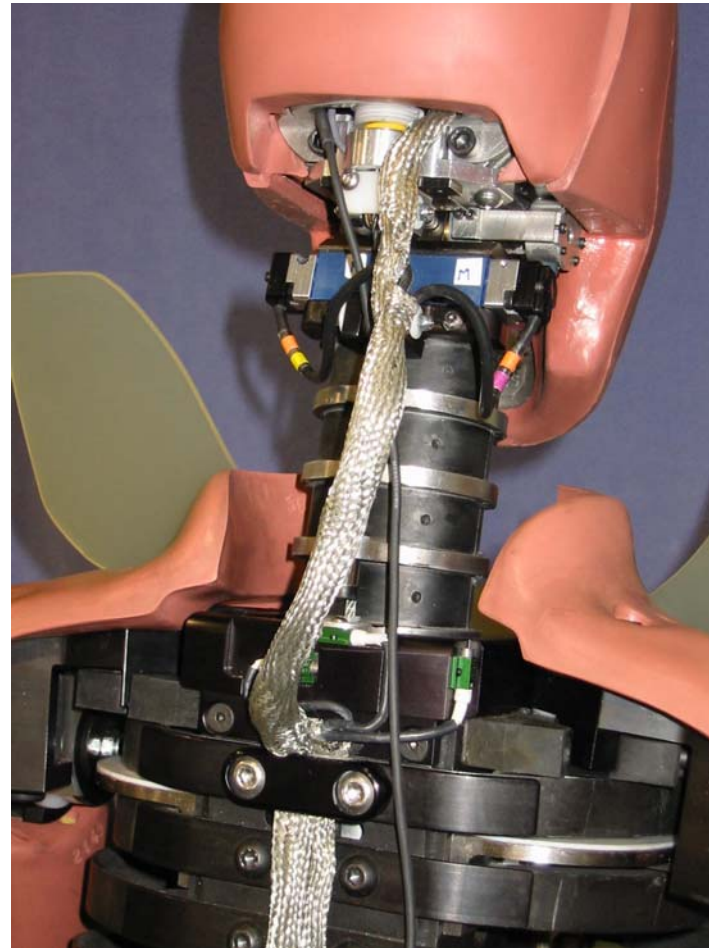


- Thick ground strap connected between dummy and DAS mounting plate.





Dummy Grounding Example (THOR)





Grounding Cable Recommendations

- **Grounding wires inside dummy should be braided strap type with at least 12-gage equivalent size**
- **Grounding wire from dummy to DAS mounting plate should be braided strap type**
- **Test Vehicle to Earth connection should be proper size depending on the length used.**



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Thank You!