

Why MODUS ?

MODUS Hispanica S.L. is the leading service provider for the holistic validation method by, **testing automotive products in the reality of the entire system**, focusing on the European market conditions.

MAIN ACTIVITY :

Testing by durability runs for

- **SYSTEM VALIDATION** of total vehicle
- **MODULE VALIDATION** of modules & components

VALIDATION EXPERIENCE :

38 mio. km 1993 - 2008
23 mio. km SYSTEM VALIDATION
15 mio. km MODULE VALIDATION

SUBJECT :

Anticipatory analysis of product quality & reliability by neutral, highly experienced experts, evaluators & engineers.

OBJECT :

Passenger cars, motorbikes & light commercial vehicles.
Production, pre-production & prototype vehicles.

CLIENT BENEFIT :

- ⇒ increased efficiency & reduced warranty costs ;
- ⇒ increased customer satisfaction.

Why brake test ?

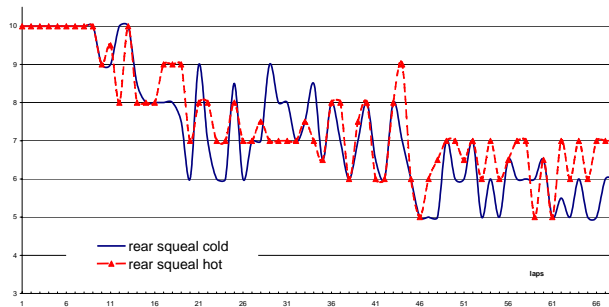
MODUS Hispanica S.L. is the leading company for evaluation & complete measurements of **brake system comfort and effectiveness** on prototypes, new and benchmark vehicles, by the validation of :

Noises & Vibrations: SQUEAL, GROAN, SCRAPE, JUDDER, SHAKE... identification, characteristics & sound level.

Severe highway stops: pressure, pedal stroke, deceleration, stopping distance (10 times 100-0 km/h).

Downhill brake performance on severe mountain route.

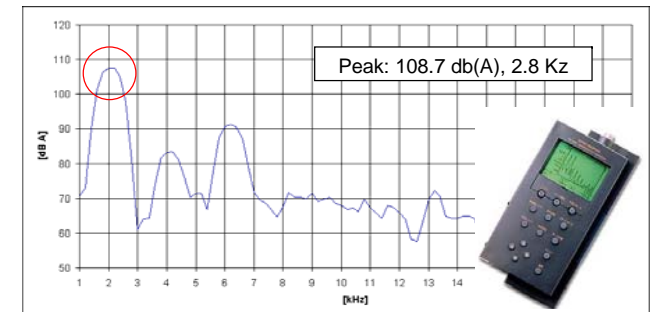
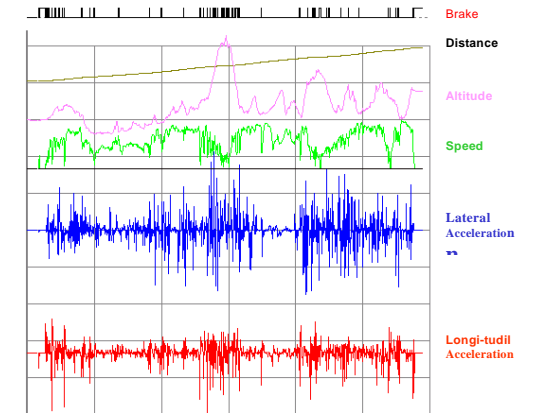
Subjective evaluation of complete brake system.



What do we measure ?

MODUS Hispanica S.L. performs measurements & engineering analysis:

- Brake disc & pad wear
- Brake disc DTV & run-out
- Touch-less measurement of disc thickness variation & run-out on disc
- Residual drag torque
- Brake temperatures
- Brake pressure
- 100% noise recording : outside microphone near each wheel, inside-artificial head with stereo microphones
- FFT analysis of noise level & frequency
- Wheel rim dust evaluation
- Tyre wear
- Test run control 100% by GPS



Why Mojacar ?

The test is performed near **MOJACAR**, a coastal town in southern Spain, at the edge of the Sierra Nevada mountain range and the only desert area in Europe.

This area is ideal for brake testing, because of the following conditions :

- **Climate:** Conditioning in high humidity (with salt content)-rapid change to desert climate
- **Road surfaces of high grip**
- **Highway** with few traffic realizing long distances with few brake events (relation disc thickness variation & run-out)
- **Mountain driving with town crossings** through narrow streets
- **Vehicle cooling down** over night in humid environment
- **Severe mountain route** close to Mojacar and with few traffic



Why 15.000 km test ?

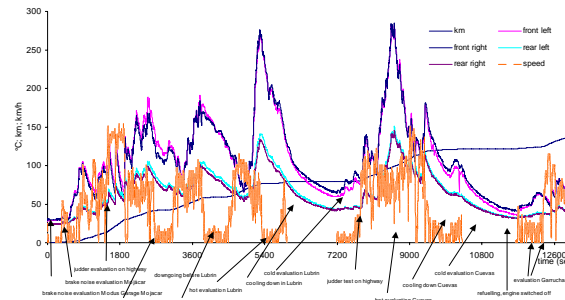
MODUS Hispanica S.L. performs a 15.000 km test (50% of average pads lifetime) to be sure that we catch all noises :

- **10.000 km on mountain**
- **5.000 km on motorway**

10.000 km on mountain road allows to cover a wide brake temperature range and to detect noise in different driving conditions.

5.000 km on motorway measure the capability of the disc to be grinded by the brake pads and reproduce real life conditions.

Regular objective measurements of DTV and lateral run-out allow to confirm the subjective evaluation of brake judder, shake and vibrations.



Global Clients

Toyota, BMW, GME-Powertrain, Opel, Daewoo, Daihatsu, Hyundai, KIA, KTM, Nissan, Yamaha, Akebono, Aisin, BBA-Friction, Bosch, Brembo, Continental, Goodyear, Delphi, Hankook, Kumho, TRW, TMD-Friction, ZF-Lenksysteme, Mitsubishi, Porsche.

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MOJACAR BRAKE TEST



EVALUATION OF BRAKE SYSTEM COMFORT & EFFECTIVENESS



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