



› CASE STUDY AVL APPLICATION SERVICES

# Improved Data Quality

@ Internationally operating OEMs

## SUMMARY

Due to increased cost and time pressure, OEMs must ensure high data quality to avoid repeating tests and to ensure the highest possible usage of measured data.

This case study describes the optimization of data quality as it has been realized in a testbed pilot project together with an internationally operating Chinese OEM. It includes all steps, from evaluating the status quo to proofing possible gains in the OEM's facility.

## CHALLENGE

OEMs must consider the quality of data as a crucial part of data collection, as not meeting quality criteria might invalidate the data or create false results if not discovered. An evaluation of the requested quality for the specific calibration task needs to be performed. Quality targets set too high will be time consuming and hard to reach, if they are set too low or if no criteria has been defined at all, it will jeopardize the quality of the evaluation results. The identification of quality measures is often overlooked due

## Fast Facts

Customer/ Department	Internationally operating OEM, Testing Department
Project location	China
Challenge/ Main target	Increase testing output together with required data quality
Solution	<ol style="list-style-type: none"> <li>1. Analysis of status quo</li> <li>2. Definition of necessary quality measures, e.g. controllers and stabilizations</li> <li>3. Implementation of changes</li> </ol> <p>All steps supported by AVL Application Services</p>
Duration	4 weeks

to the common gap of responsibilities between the testing department and its customers.

## SOLUTION

### 1. Assessment of initial condition

As a first step, an assessment of the initial data quality status was made. The following main points were integrated in the evaluation of the status quo of the OEM's testbed:

- Hardware set-up
- Media controllers
- Testbed controllers
- Testing strategy
- Measurement repeatability

The assessment was based on actual testbed data and observations made by AVL experts on site. The analysis gave an objective view of the data quality by placing it in relation to industry standards. At the same time, the test cell hardware set-up was analyzed regarding possible improvements.

It was found that emission-, load- and media controller improvements were required.

### 2. Improvement actions

The basis for high-quality data are stable and correct levels of media controllers in order to provide the required environmental conditions for the engine. In this case, modifications were necessary both in hardware set-up and controller tuning in order to meet the requirements. Regarding the emission measurement equipment, the situation challenge was similar.

Process descriptions, checklists and test instructions were also identified as important areas for possible improvements.

To achieve high repeatability, the test set-up as well as stabilization time and criteria were key factors in combining high quality with minimal time effort. The initial condition at the OEM R&D department was one shift of manual operation.

During the pilot project, the Puma Open test cell control system was set up for fail-safe unattended operation. This way it was possible to run the engine using the defined stabilization time and/or stabilization criteria before each measurement, which has a direct impact on higher data quality.

Furthermore, by implementing the fail-safe automation, utilization was doubled through unattended operation.

## RESULT

Data quality was improved by a combination of factors: optimized hardware set-up, controllers and automated tests using the full capability of the available system.

Achievements:

- Significantly increased repeatability
- High data quality
- Fail-safe unmanned operation
- Doubled utilization time
- Improved testing approach

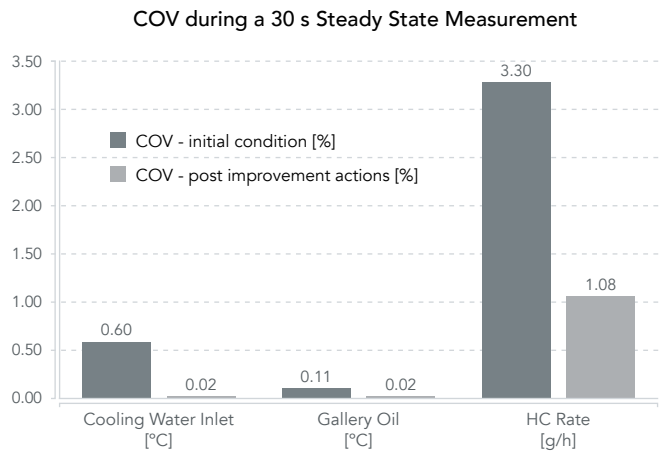


Fig. 1: Coefficient of Variation (COV)

## OUTLOOK

Substantial improvement of data quality and utilization was achieved during the project. A strategic approach considering all aspects is necessary to maintain the data quality and forward the lessons learned to other cells.

AVL Application Services is a long-term partner for know-how support and introduction of new approaches in development and testing.

## FOR FURTHER INFORMATION PLEASE CONTACT:

E-mail: [christopher.christ@avl.com](mailto:christopher.christ@avl.com)  
[www.avl.com/Application-Services](http://www.avl.com/Application-Services)