# SECUR ROAD

**The easy road for safety**



# From italian engineering intelligence to global execution

## Who we are

**Secur Road is an Italian-Chinese engineering partner for automotive companies and truck manufacturers. We supply Engineering and Industrial Consulting for Automotive Components.**

We are a team of engineers, sourcing specialists and quality experts operating through an established network of qualified suppliers.

We are not a traditional engineering supplier: we are a performance-driven engineering partner, built to solve real problems in the automotive supply chain.

We combine italian engineering intelligence with chinese industrial execution (speed, scalability, cost competitiveness).

**The result: faster product development, higher reliability, and stronger market competitiveness.**

## Reducing risk, increasing control

In the automotive industry, failure is not an option.
We operate to eliminate technical uncertainty before it becomes a cost:

- **Full alignment with OEM standards (APQP, PPAP, IATF)**
- **Strong focus on validation**
- **Continuous process control**

We don't just design — we ensure results in production.

## Accelerating time-to-market

Delays mean lost opportunities.
We structure our activities to reduce lead times without compromising reliability:

- **Fast response to technical changes**
- **Support from RFQ phase to industrialization**
- **Fast prototyping mindset**

We don't follow timelines. We improve them.

## Designing for cost

A good design is not enough. Competitiveness is key.
We apply Design-to-Cost from the very beginning:

- **Optimization of materials and geometries**
- **Simplification for manufacturing**
- **Cost-driven engineering decisions**

We reduce total cost, not increase complexity.

## Seamless Europe–Asia integration

We are the direct link between engineering and production.

- **European technical standards**
- **Direct interface with Asian suppliers**
- **Continuous coordination between engineering and manufacturing**

We don't just communicate — we integrate the supply chain.

## What we do

We support the entire product development cycle:

- **Technical feasibility analysis**
- **Design for Manufacturing (DFM)**
- **Prototype development**
- **Tooling and mold development**
- **Supplier selection and qualification**
- **Production process development**
- **PPAP documentation management**
- **Production launch support**

## Quality & control

- **Supplier audits**
- **Production monitoring**
- **Quality inspections**
- **Supply chain risk reduction**

We ensure visibility, control, and reliability across the entire supply chain.

## Industries & components

We work with:

- **Commercial and industrial vehicle manufacturers**
- **Tier 1 & Tier 2**
- **Aftermarket companies**

Components:

- **Plastic components**
- **Metal components**
- **Plastic/metal assemblies**
- **Custom-designed components**

## Why choose us

- **Reduced technical and supply chain risks**
- **Cost optimization**
- **Faster development cycles**
- **One single partner for complex projects**

We simplify complexity and turn projects into concrete results.

## Positioning

The ideal partner for companies aiming to:

- **Reduce risk**
- **Accelerate development**
- **Optimize costs**
- **Control global production without compromise.**

**Secur Road:
where engineering meets
industrial performance**







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# Case history

**Drive shaft support optimization**
**p/N 500043461**
**IVECO DAILY commercial vehicle**



## Context

The IVECO DAILY commercial vehicle already in production showed critical issues in a key component of the drivetrain: the drive shaft support.
The component, consisting of:

- **A metal bracket fixed to the chassis**
- **An elastomeric element (rubber)**
- **A central bearing mounted on the shaft,**

is essential to ensure system stability, vibration damping, and overall durability.

## Issues Identified

During field operation, two main issues were identified:

### 1. Premature corrosion

- **Appearance of rust after approximately 3 months**
- **Localized on the bracket fixed to the chassis**
- **Worsening under harsh environmental conditions (humidity, salts, dirt)**

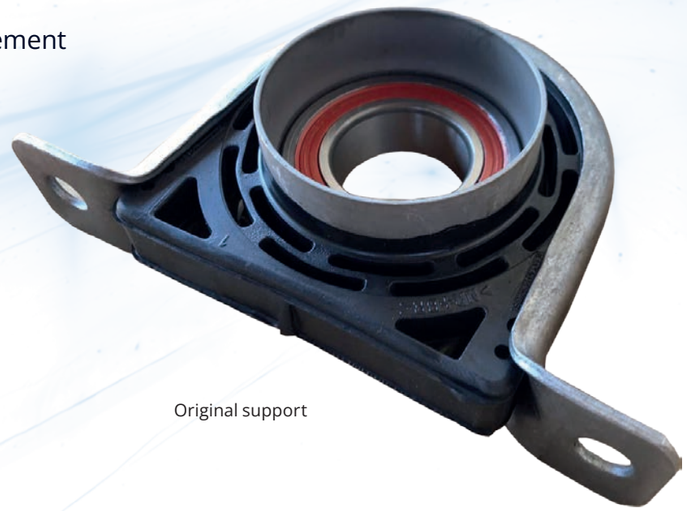
### 2. Deformation of the elastomeric element

- **Noticeable deformation of the rubber**
- **Loss of bearing alignment**
- **Increase in vibrations and noise (NVH)**

## Target

Identify the root causes and develop a technical solution capable of ensuring:

- **Improved corrosion resistance**
- **Enhanced mechanical and vibrational performance**
- **Increased component service life**



Original support

## Activities Performed

A multidisciplinary intervention was developed:

### Material and corrosion analysis

- **Verification of the surface treatment (inadequate galvanization)**
- **Metallographic analysis of the bracket**
- **Salt spray chamber testing**

### FEM Simulations (Finite Element Method)

- **Analysis of stresses acting on the rubber**
- **Study of strain distribution**
- **Identification of critical areas with concentrated stress**

### Experimental Testing

- **Bench vibration tests (NVH)**
- **Vehicle testing under real operating conditions**
- **Comparative validation before/after the intervention**

### Component redesign

- **Revision of the elastomer geometry**
- **Stiffness tuning optimization**
- **Improvement of the constraint points**

### Materials and supplier review

- **Introduction of a new anti-corrosion treatment (e.g. cataphoresis + improved galvanization)**
- **Selection of a more resistant elastomer compound**
- **Involvement of qualified suppliers**

## Implemented Solution

- **Metal bracket with advanced surface treatment for high corrosion resistance**
- **New rubber geometry optimized to reduce permanent deformation**
- **Improved rubber-to-metal interface for enhanced durability**

## Results Achieved

- **Elimination of premature corrosion (tests passed > 500h in salt spray chamber)**
- **Significant reduction in rubber deformation**
- **Improved NVH comfort (reduced perceived vibrations)**
- **Increased component service life**
- **Reduction in warranty and maintenance costs**

## Added Value

This intervention made it possible to:

- **Increase vehicle reliability**
- **Improve perceived quality for the end customer**
- **Strengthen collaboration between the oem and technical consultancy**



Used support

**The easy road for safety**

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# Case history 2

**Engine oil filter optimization**
**p/N 2992544**
**IVECO STRALIS commercial vehicle**




## Analyzed product

Engine oil filter used on IVECO STRALIS heavy-duty vehicles, designed to:

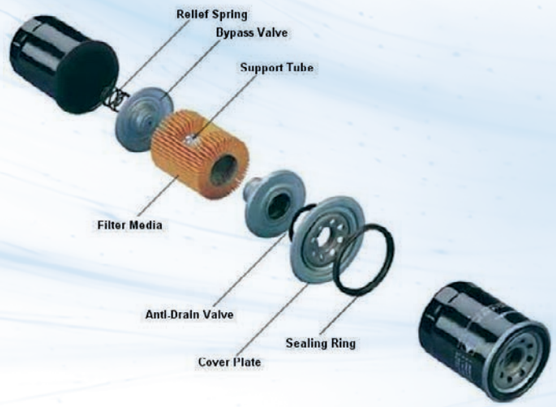
- Retain particulate matter and contaminants
- Ensure adequate oil flow rate and pressure
- Protect critical engine components

## Identified issue

During fleet operation, several critical issues emerged after prolonged usage cycles:

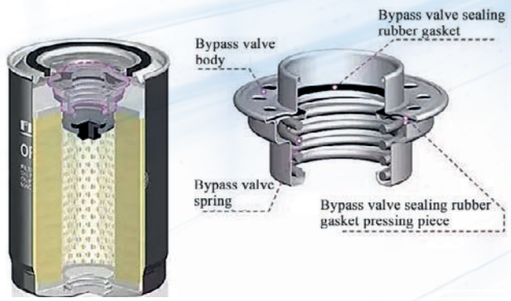
- Premature filter degradation
- Early clogging of the filter media
- Reduced filtration capacity
- Frequent bypass valve activation
- Unfiltered oil circulating
- Increased wear of engine components
- Partial collapse of the filter media
- Internal deformation of the filter
- Risk of contaminant release

Exploded view of a typical oil filter




## Target

- Improve filtration efficiency
- Increase operational lifespan
- Ensure structural stability of the filter
- Reduce bypass valve activation







## Activities carried out

### Laboratory analysis

- Disassembly of used filters (field return analysis)
- Contaminant analysis (particles, sludge)
- Internal structure inspection

### Performance testing

- Flow rate and pressure drop tests
- Differential pressure resistance testing
- Bypass valve opening validation

### FEM Simulations (Finite Element Method)

- Analysis of filter element deformation
- Identification of collapse zones
- Optimization of the support structure

### Redesign

- Introduction of a composite filter element (treated cellulose + synthetic fibers)
- Reinforcement of the internal structure (metal components)
- Optimized calibration of the bypass valve

### Validation “on the road”

- Testing on real vehicles (fleet tests)
- Performance monitoring over time

## Implemented solution

- High-capacity filter media (improved particle retention)
- Reinforced internal structure > prevents collapse
- Optimized bypass valve > activation only under critical conditions

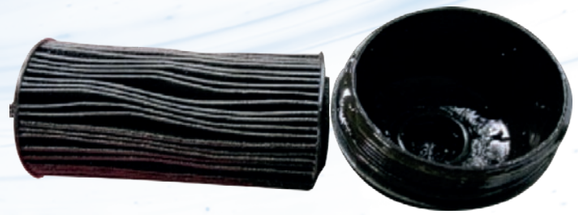
## Results achieved

- +40% filter lifespan
- Significant reduction in bypass valve activation
- Improved engine protection
- Reduced wear of internal components
- Lower maintenance costs

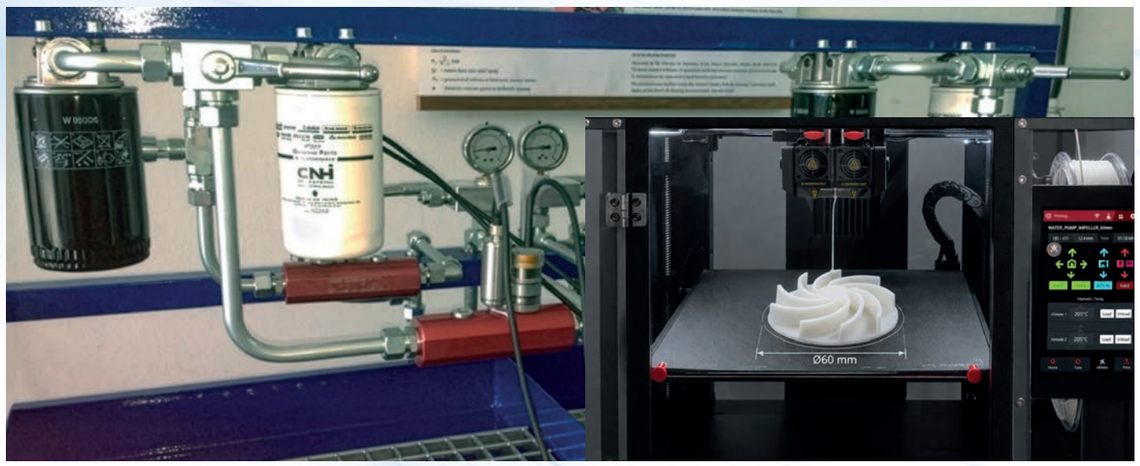
## Added value

- Increased engine reliability
- Improved fleet performance
- Optimization of operating costs

The optimization of the oil filter made it possible to significantly improve lubrication quality, increasing the component’s service life and reducing the risk of premature engine wear.



Dirty filter media






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# Case history

**NOx sensor malfunction**
**p/n 5801777219**
**SCR system – IVECO STRALIS vehicle**



## Context

In a fleet of Euro VI heavy-duty vehicles (Cursor engines), the following issues were reported:

- **Recurring engine warning light activation**
- **Increased adblue consumption**
- **Activation of derating mode**

The system involved was the SCR (Selective Catalytic Reduction), with a focus on the downstream NOx sensor after the catalyst.

## Identified issue

### Main symptoms

- **Unstable and inconsistent NOx values**
- **High readings even under normal operating conditions**
- **Delayed sensor response**
- **Diagnostic evidence**
- **Frequent DTCs (e.g., NOx sensor plausibility / slow response)**
- **Abnormal difference between upstream and downstream sensors**

## Root cause analysis

### 1. Component analysis (tear-down)

- **Visible deposits on the sensitive tip**
- **Presence of urea (AdBlue) crystallization**

### 2. Functional verification

- **Response time out of specification**
- **Sensor still active but degraded**

### 3. SCR system analysis

- **AdBlue injector with suboptimal spray pattern**
- **Deposit formation in the exhaust section**

## Identified root cause

Progressive contamination of the NOx sensor due to:

- **Poor adblue atomization**
- **Non-optimal thermal conditions**
- **Accumulation of urea crystals on the sensitive cell**



## Implemented intervention

### Actions on the component

- **Replacement of the NOx sensor**
- **Introduction of an updated version (greater resistance to contamination)**

### Actions on the system

- **Replacement / cleaning of the AdBlue injector**
- **Optimization of the ECU dosing strategy**
- **Validation**
- **Laboratory testing**
- **Monitoring of NOx parameters and AdBlue consumption on the road**

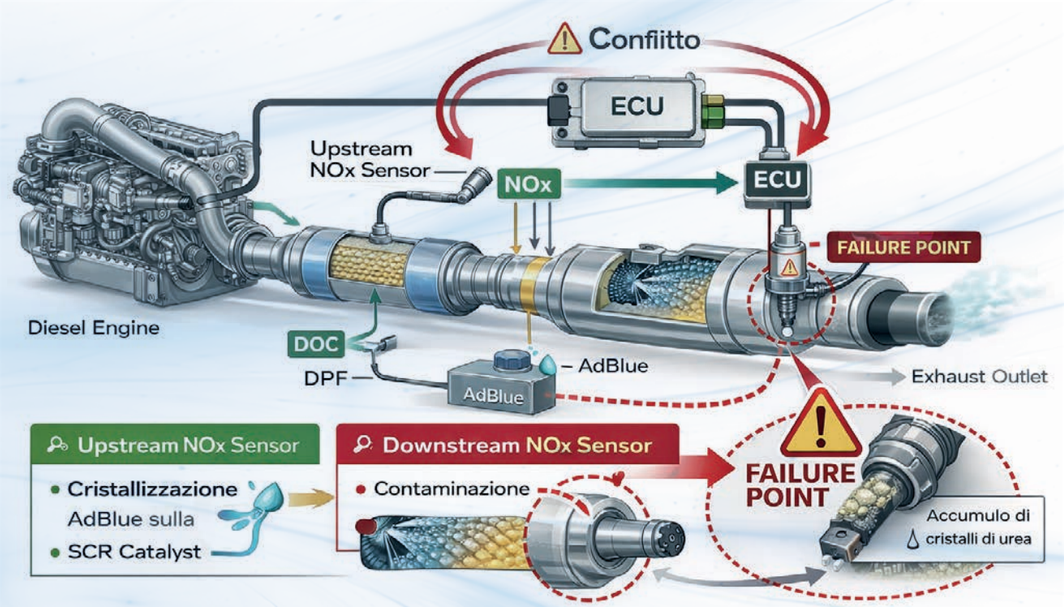
## Results achieved

- **Elimination of diagnostic errors**
- **Reduced AdBlue consumption (−15%)**
- **Restoration of proper SCR system operation**
- **Elimination of derating mode**

## Added value

- **Improved reliability of the emissions system**
- **Reduced fleet maintenance costs**
- **Increased vehicle availability**

The sensor was NOT the root cause, but a victim of the system.
The degradation of the NOx sensor was caused by non-optimal operating conditions of the SCR system, highlighting the importance of a systemic approach in emissions component diagnostics.




SCR Diesel System - Criticity of the NOx downstream sensor





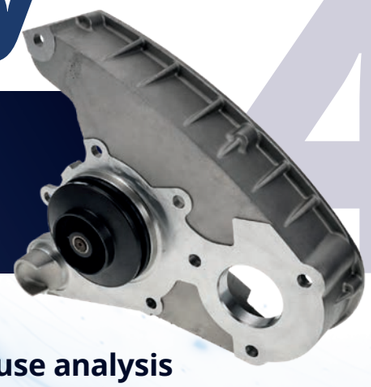
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# Case history

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## Water pump impeller failure in the engine cooling system IVECO STRALIS



## Context

In a fleet of IVECO STRALIS vehicles, the following issues were reported:

- **Episodes of engine overheating**
- **Reduced cooling system performance**
- **Vehicle downtime under demanding conditions**

Component under analysis: engine water pump

## Identified issue

### Main symptoms

- **Rapid increase in coolant temperature**
- **Poor circulation within the circuit**
- **No visible leaks**
- **Intermittent noise**

### Evidence

- **Temperature out of range during uphill driving /high load**
- **Insufficient coolant flow rate**

## Analysis

Component tear-down. Impeller showing:

- **Eroded blades**
- **Partial breakage of some vanes**
- **Irregular surface**

### Functional verification

- **Significant reduction in flow rate**
- **Abnormal fluid turbulence**

## Root cause analysis

Advanced cavitation of the impeller

### Contributing factors:

- **Coolant degradation (loss of anticavitation additives)**
- **Presence of vapor bubbles in the circuit**
- **Non-optimal system pressure**
- **Possible presence of air**

## Solution

Intervention on the “pump impeller” component:

- **Development of a new pump impeller through prototyping**
- **Functional testing of the prototype impeller on a test bench**
- **Production release of the new impeller**



Damaged impeller



New impeller (optimized blades)





## System intervention

- **Complete replacement of the coolant**
- **Circuit bleeding (air removal)**
- **Pressure check and inspection of the system cap**

## Validation

- **Road testing**
- **Monitoring of temperature and flow rate**

## Results

- **Restoration of proper coolant circulation**
- **Stabilization of engine temperature**
- **Elimination of vehicle downtime**
- **Reduction in maintenance interventions**

## Added value

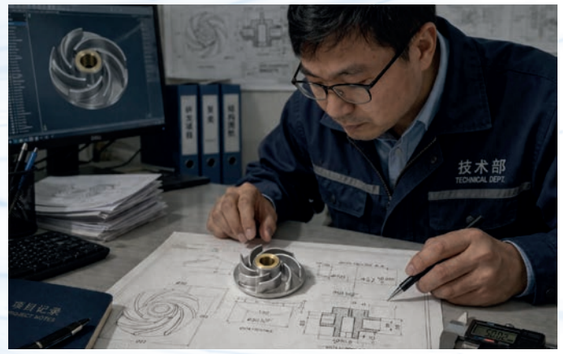
- **Increased reliability of the cooling system**
- **Reduced operating costs**
- **Prevention of engine damage (cylinder head, gaskets)**

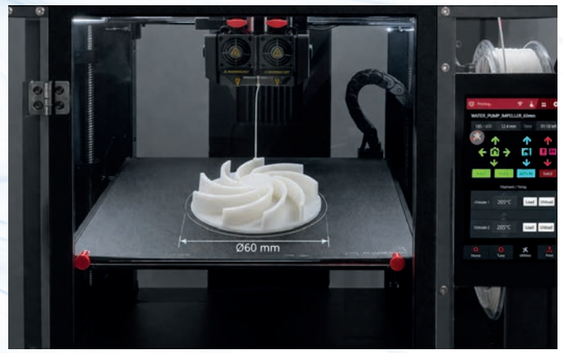
## Key insight

The impeller failure is an effect, not the root cause. The phenomenon is generated by improper fluid operating conditions.

Cavitation is one of the main causes of impeller degradation, highlighting the importance of coolant quality and proper management within the system.






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