THE MAGAZINE FOR INDUSTRIAL VEHICLE TECHNOLOGY, DESIGN & ENGINEERING

iVT INTERNATIONAL

INDUSTRIAL VEHICLE TECHNOLOGY

AEF takes on:
Camera systems and high voltages

What's new in:
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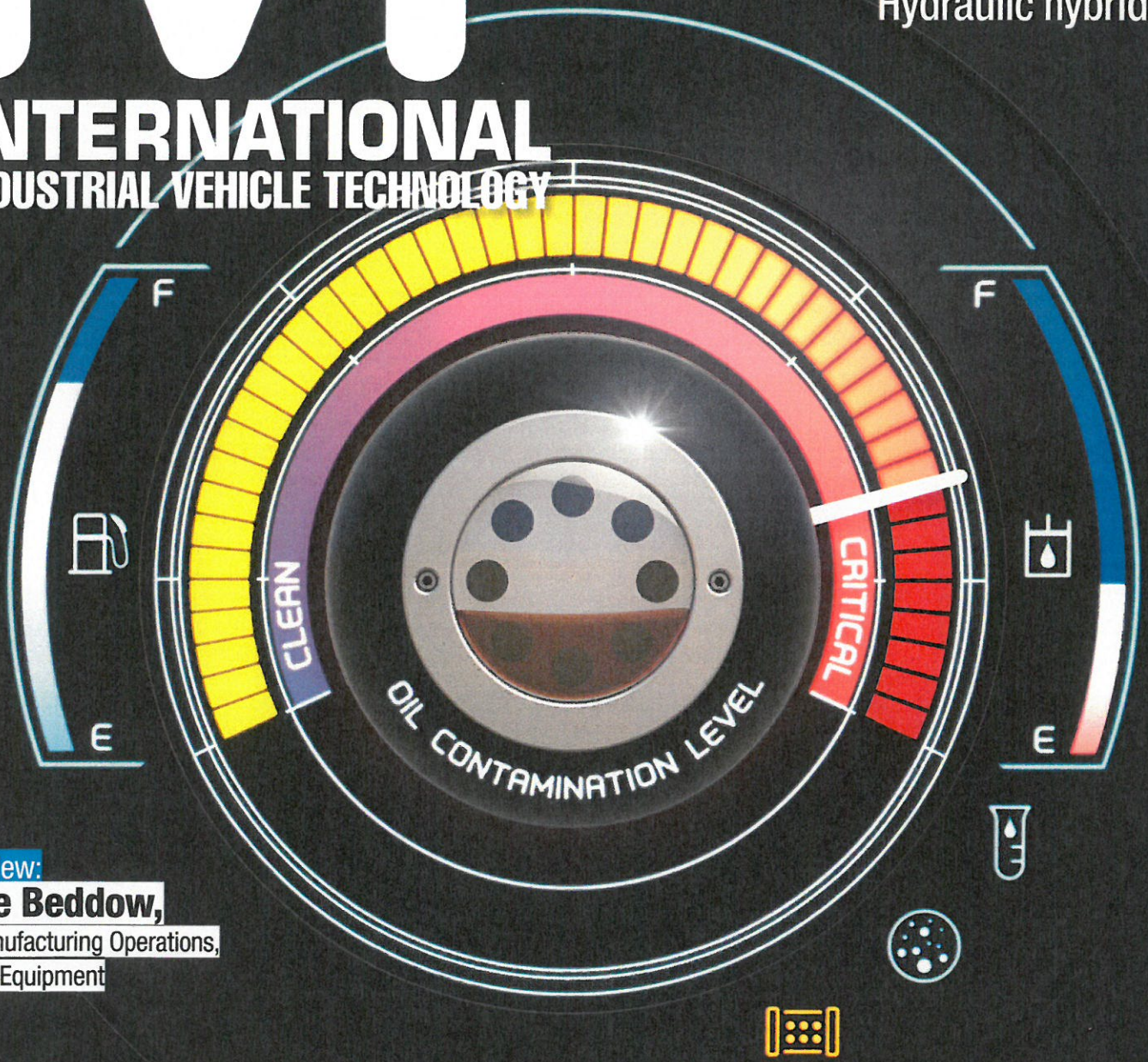
Design Challenge:
Hydraulic hybrids



nterview:
Dave Beddow,
/P Manufacturing Operations,
Crown Equipment

Let's talk dirty

Who says your hydraulic oil really is clean?

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JEAN MARC GUITTARD

Critical list

THE DAYS OF ONE-SIZE-FITS-ALL HVAC VEHICLE SOLUTIONS ARE LONG GONE. BUT WITH A VAST RANGE OF MACHINE TYPES AND SIZES TO CATER FOR, THE IMPORTANCE OF PRODUCING A SYSTEM TO MEET THEIR EXACT REQUIREMENTS IS INCREASINGLY VITAL

In the 28 years since it was founded, SNDC's role within the HVAC market has constantly evolved and transformed. Today, the main challenge confronting its customers' engineering, purchasing and service departments is providing the correct description of their HVAC requirements to ensure the most suitable technical solution is chosen.

Specifying a system that is fully compliant with standards, machine environment integration, end-user expectations and, last but not least, meeting the purchasing target price, can all be very difficult to achieve. But as a result of its customer operation environment and long history of delivering comfort, SNDC is able to back up its expert HVAC function with a role in the writing of specifications.

From a customer's initial contact to the end of a product's lifetime, HVAC development can be a long process. The growth and diversity of requirements means most OEMs are no longer able to adapt off-the-shelf units to enjoy the price benefits that result from economies of scale. Each system is now specific, meaning the long list of a customer's legitimate requirements never comes to an end.

The following paragraphs, and the next edition of *iVT International* will describe the processes that must be taken into account, as well as the tools used by SNDC to achieve this.

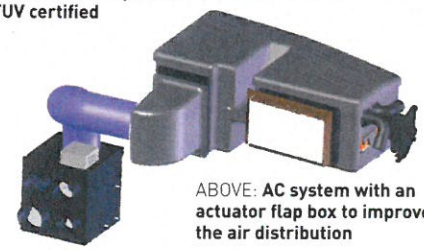
Comfort requirement support

The definition of comfort is often abstract, with standards often challenged by an end-user's comfort expectations. The desired temperature inside the cab is not the only criterion taken into account by the operator. The time taken to achieve this temperature, noise ventilation emissions, the feeling of the airflow, maintenance frequency of fresh air filters and the defrosting and defogging of windows – all this is difficult to apply criteria to when writing specification.

For this purpose – the definition of objective and subjective HVAC function criteria – the role of SNDC is twofold: the company must assist the customer in drafting the specifications, and meet and exceed those with the end results.

The preliminary stages of HVAC design involve calculation and simulation, then the finalizing of the design. Modification of just one of the input data often leads to an evolution in the calculations, which itself changes the overall results of the simulations and culminates in a product with a different volume and capacity. It is this observation that led SNDC to work all three phases of design in a single environment integrating computation, simulation and design.

ABOVE: **SNDC's production line is ISO 9001 TUV certified**



ABOVE: **AC system with an actuator flap box to improve the air distribution**

The company relies on a variety of computation tools to ensure optimum results, including:

Thermal balance: Especially developed for SNDC, the thermal modeling software must take into account various parameters to calculate exchanges between the different environments and geographic areas in which the machine operates; typically involving ambient temperature, humidity and wind-speed. But other parameters are taken into account, too, such as the desired indoor temperature, window and wall surfaces, orientation, thickness and thermal conductivity, cab color and refreshment of cab air. The thermal balance should also allow for determining the selection criteria for, and influence of, items such as wall insulation or volume fresh air renewal.

Frigorific design: On the outside, an AC system looks simple and appears to be built with identical components. SNDC's frigorific performance software stores the details of each component that plays a role in the refrigerant circle: a minor change to one parameter will create a snowball effect influencing the final cooling performance and, last but not least, the reliability and longevity.

Installing an oversized evaporator somewhere the compressor cannot deliver enough refrigerant flow is like a truck attempting to pull a heavy load uphill using a car engine. Similarly, a condenser incapable of coping with the heat rejection absorbed in the refrigerant circuit (compressor and evaporator) will reduce the efficiency. Even the use of different hoses between one vehicle and another will influence the performance of the final system.

To ensure the compressor lifetime, it is therefore of great importance to survey the running conditions, especially when they are likely to be very high or low.

In the September edition of *iVT International*, this exploration of SNDC's HVAC engineering expertise will continue with a look at its simulation tools, test resources, technologies and component choices, and production line integration. **iVT**

Jean Marc Guittard, president, founded SNDC in 1986