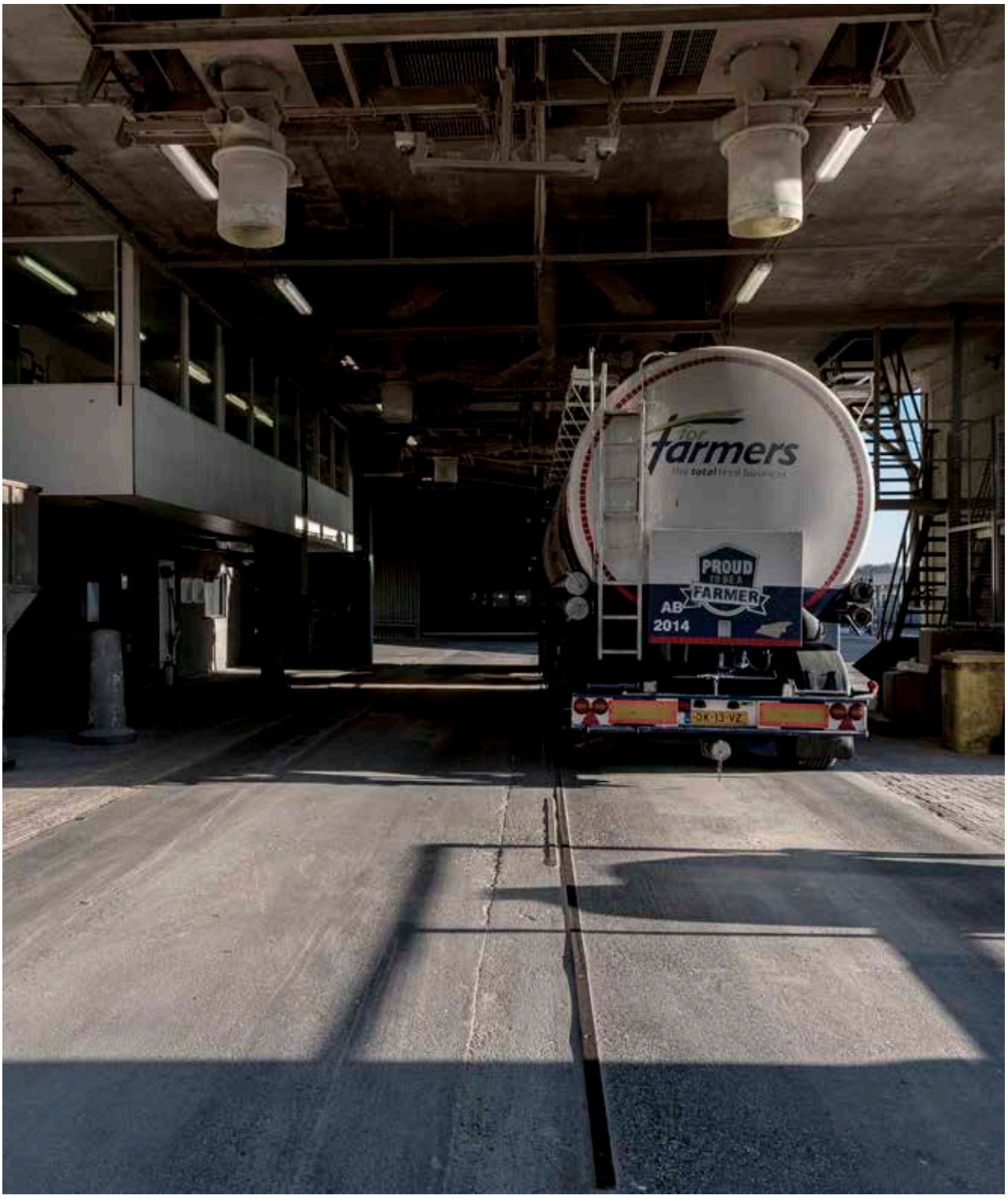
FOSS

FOSS IN FEED



ANALYTICS BEYOND MEASURE

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Today even the most accomplished feed producers face the challenge of getting more and more out of their raw materials while still improving their product quality. That is a tall order in an industry built on highly variable raw materials and quickly changing markets. But where nature is unpredictable, data harvests never fail.

By driving digitalisation forward, you can add a new level of automation to your business and secure quality and consistency. You will be able to limit the number of human errors that slow you down. Scale your business faster. And reduce manual labour and labour costs.

A lot can be lost and a lot can be won on the journey from raw material to finished product. That is why we have spent the last 60 years developing and refining instruments that measure every little step of the way. We translate measurements into mathematical algorithms that power automated systems, optimise your manufacturing process and make you grow. Securing and improving food quality is what we do.

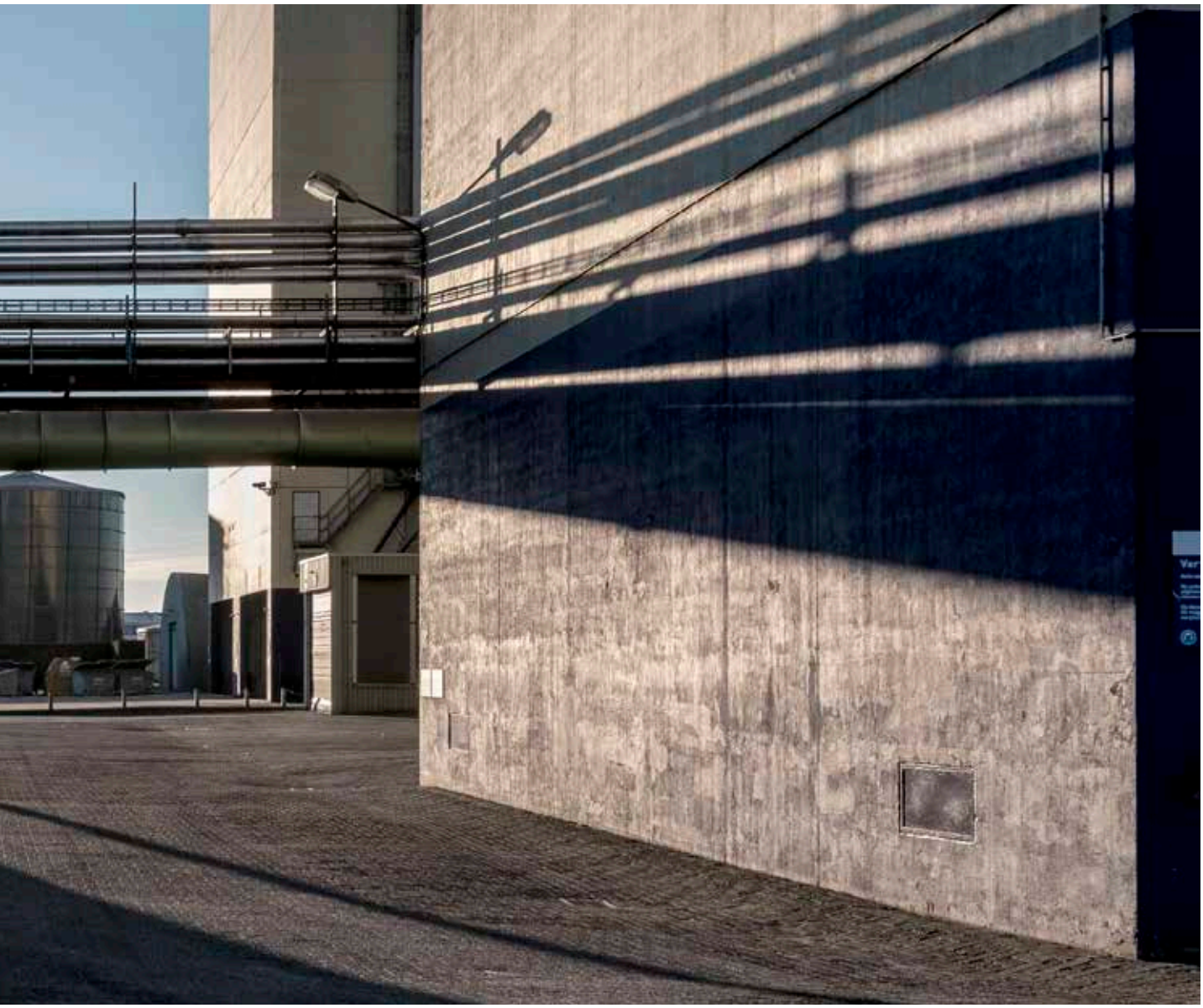
Neither natural resources nor knowledge go to waste. Intelligent information management can turn existing production into efficient processes that generate less waste, bigger yields and higher quality.

We call it:
Analytics Beyond Measure

TAKE CONTROL OF RAW MATERIALS FOR IMPROVED PROFIT

Another delivery draws up to the weighbridge. You know that your decision on how to handle it will impact profitability downstream in the process, yet you are not always free to make the ideal move.

You might be receiving poor quality raw materials without knowing it because it's not possible to test each and every delivery. This can lead to variation in the composition of your raw material and will demand a higher safety margin to meet specifications. Plus, there's a risk of lower pellet quality as well as the risk of fines and low storage life.

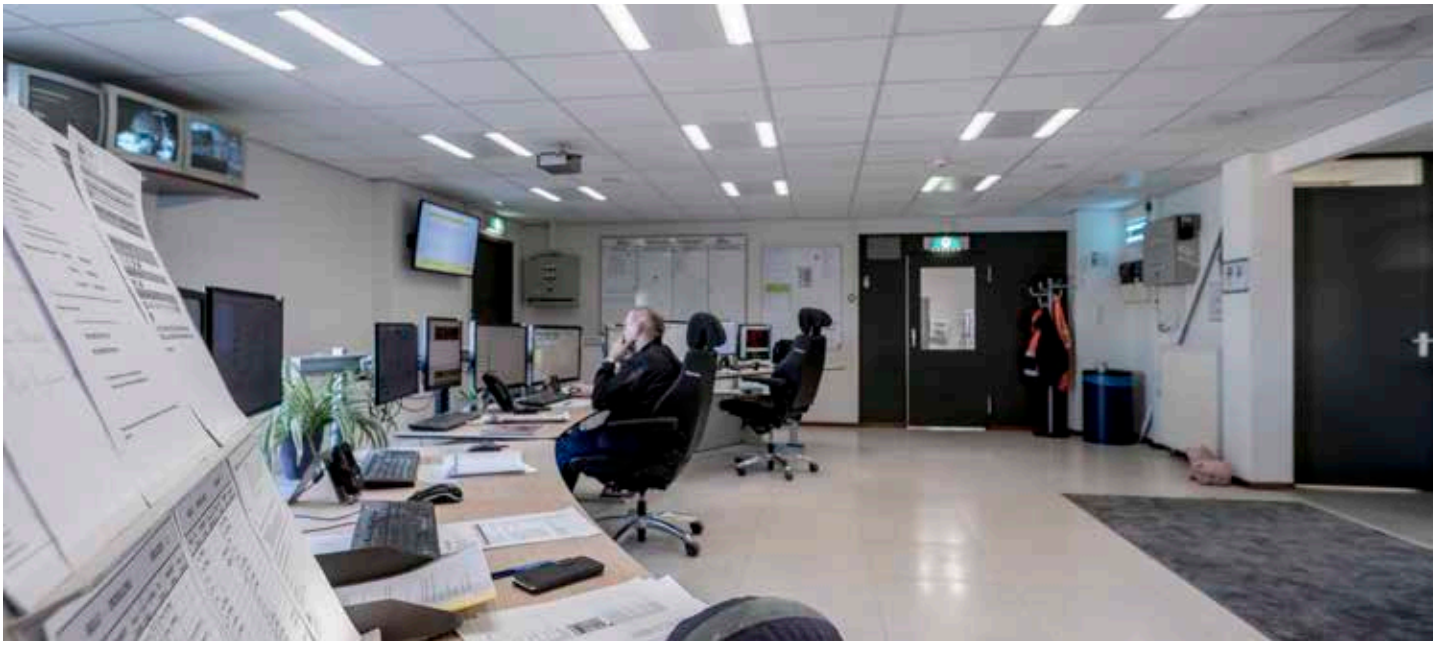


Reduce variability with rapid analysis at the weighbridge

But the inevitable variability in deliveries need not be all bad news. While some shipments will be below others will be above specifications. Understanding the variation and identifying individual shipments that are out of spec will improve your profitability. Ingredients receival is a perfect control point for monitoring this variation based on rules and targets. The ability to measure more samples with rapid and convenient analysis will give you enhanced monitoring of your key ingredients. Just one simple test in less than one minute allows you to check all deliveries. With those immediate on-site results you can stop poor raw-materials at the gate and make the very best of the material.

You have just moved into the driver's seat and are now actively managing your raw material, for:

- Documented quality of all incoming raw materials
- Improved ability to claim against below-spec materials
- Better quality targets for your suppliers based on the top-performers
- a smoother supply of material for more efficient production downstream



PRODUCE CLOSER TO SPECIFICATIONS TO PREVENT PROTEIN GIVEAWAY

How can you produce close to specification when the cost and quality of your raw material is always changing?
It is a common challenge in feed production, yet the analytical tools are available to help you remain agile. For instance, you can switch between raw materials based on price, availability and actual nutrient content. You can also move your moisture target closer to specification to avoid protein give-away to boost revenue per production line without increasing raw material costs or compromising quality.

By using FOSS NIR solutions in your pet food production you can:

- Save money by reducing protein give-away
- Increase your yields without increasing your current raw material cost
- Decrease cost and time spent per sample

Example: savings on raw material:

A pet food manufacturer produces 100,000 tons of kibble annually on one of their lines.
Through real-time measurement, they can move their moisture target 0.5% closer to specification.
The results in savings of 0.5% x 100,000 tons = 500 tons per year to produce the same amount of kibble.

CONSISTENT PELLET QUALITY WITH EFFECTIVE MANAGEMENT OF MOISTURE AND FAT IN THE MIXER

The physical properties of your feed pellets are critical for fish farmers.
The pellets must be durable to remain intact up until they are fed to the fish. At the same time, they cannot be too hard as this will affect digestion and finally they need to have the right density in order to sink slowly through the water. In fact, it is something of an art to get them right consistently without incurring fines or raising costs.
Controlling moisture and fat in the feed mash allows you to improve quality and consistency of the extruded pellets. By measuring directly in the mixer with FOSS inline solutions you can adjust the dosing of water and oil in real time and ensure that a consistent mash goes into the extruder at all times. You can also maintain consistent moisture content to lower raw material cost and improve pellet quality. FOSS feed solutions help you to reduce rework and claims while improving product consistency and customer confidence in your pellet products.

OPTIMISE YOUR TOTAL MIXED RATION WITH ACTUAL NUTRIENT CONTENT

Before you can get an optimal Total Mixed Ratio (TMR) formulation, you need to know the actual nutrient content of both your forages and your compound feed ingredients at the time of mixing. While purchased feed is normally well documented, the nutrient content of silages and other forages stored close to the animals is often determined by sending samples to the laboratory. Today most TMR formulation is based on lab analysis of a single sample from the silage clamp, but how can you be sure that it is representative? Studies show that there is significant variation in the nutrient and dry matter content across the silage clamp.

Designed for use in the harsh environment of the farm or the feed lot, FOSS analytical solutions allow you to analyse the nutrient content of fresh silages in less than a minute close to the clamp.
With real-time results you can optimise the the ratio of feed to silage and ensure optimal savings. Based on the documented variation in silage clamps, this can result in an improved yield of up to several liters of milk per cow per day.

NETWORKING FOR MORE PROFITABLE USE OF FEED INGREDIENTS

The use of feed additives and speciality micro ingredients allows you to get more value from costly raw materials.
Today, most suppliers of feed additives and micro ingredients use NIR analysis of feed and raw materials to determine special ingredients such as amino acids and how to use them. And FOSS can help you to work more effectively with not just a few suppliers but a whole range.
FOSS solutions are approved by all the major global ingredient providers and a growing number use FOSS networking solutions to connect to their customers.
FOSS also provides comprehensive and robust calibration models for both raw materials and ingredients. These allow you to analyse the nutrient content of your raw materials and your final feed to optimise production.
If you need a calibration model to ensure optimal dosage of speciality ingredients this would normally be available from the ingredient supplier making it attractive to be able to use calibration models from a number for suppliers to compliment each other.
FOSS networking services allow you to work with multiple partners and over multiple sites.

Reduced costs and higher performance

Representing over 50.000 spectra data sets referenced against more than 300.000 wet chemistry values, the FOSS ANN calibrations cover a wide range of feed and feed ingredients.

Advantages include:

- Less sampling costs – now sampling is only required for checking the calibration
- Flexible sourcing – now you can switch supplier with ease because potential variations in raw material are already included in the comprehensive ANN data set.
- Faster operations - with a single calibration covering a number of different sample types, the operator does not need to keep changing the sample type

ANN versus traditional PLS calibrations

When NIR was first introduced in the Feed industry, calibrations where based on PLS or Partial Least Squares regression methodology. These were developed for a specific crop within a country or region and were based on adding local data to a small starter calibration. PLS calibrations are reliable and effective, but involve reference analysis for approximately 100 samples per sample type and subsequent development of the calibration.
In contrast, ANN calibration models make it easier to develop calibrations with very large datasets These datasets can cover seasonal variations, geographical variation as well as different breeds/varieties. The global ANN calibration is ready to use and the only sampling needed is for validating the validity of the calibration as described in ISO 12099

TECHNOLOGY OVERVIEW

Near infrared analysis

FOSS NIR solutions provide analysis of feed with exceptional accuracy. Feed quality control often involves handling a variety of samples, from powder to whole grain and pellets.

The highly versatile NIRS™ DS2500 F is based on near infrared reflectance with a full wavelength range of 850 nm to 2500 nm giving you the flexibility you need in routine testing. Regardless of whether you are testing moisture, fat and protein or more demanding parameters such as amino acids, ash of fibre, the NIRS™ DS2500 F delivers precision results in under a minute. For measuring colour (eg. petfood), the instrument is also available in an extended version that includes a broader wavelength of 400 to 2500 nm.

The NIRS™ DA1650 is purpose built to deliver results close to the production line. The sealed Digital Diode Array (DDA) platform withstands vibration, dust or spills that can occur during regular use by plant operators and has been designed for high performance in the hardest production environments.

Near infrared in the process

Near Infrared can also be applied directly in the process flow with the ProFoss™ analyser. For instance, in feed milling, the ProFoss can be mounted directly in the process where it measures moisture and protein in feed mash every few seconds for optimal and consistent pellet quality. The results are fed back to a computer in the mill control room and displayed on an intuitive graphical interface.

Measurements are made using a high-intensity dual-lamp light source that illuminates the sample directly or through an optical fibre. The light interacts with the sample and the reflected or transmitted light is measured by the diode array sensor. The complete wavelength range is measured instantaneously enabling measurements to be accurately carried out even on fast moving samples. Calibrations are transferable between units and integration to process regulation systems through Kepware. Ethernet network is preferred, but Profibus, Profinet or analogue signals can also be used.

Automated laboratory methods

Standard tests such as crude fibre are not always the most convenient tests to perform, but are nonetheless essential for reference and labelling purposes.

FOSS automated laboratory solutions include innovative features designed to make procedures as fast, cost-effective and safe as possible while reducing the risk of human error. With the Fibertec™ 8000, samples are handled separately in standard filter crucibles which are used both as an integral part of the assembly during extraction, rinsing and filtration and as sample vessels during weighing, drying and ashing. Sample residue remains in the crucible during the whole procedure, avoiding sample transfer and associated risk of error.

Digital connectivity

FossManager™ empowers you to manage analytical instruments directly from your PC while FossAssure™ Pro helps you to ensure accuracy and uptime.

A network comprises a group of standardised instruments controlled from a network administration centre ensuring that all units will give the same performance independent of operator or location. The master instrument is also used to monitor the accuracy of the calibrations.

The entire network can quickly be updated or upgraded with new calibrations from the centre. Calibration costs are reduced, administrative routines are simplified, and duplication of effort is eliminated.

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