

BALEMAT 2

The 2nd generation automated bale testing system

GENERAL CONCEPT EXPLAINED

The Bailemat II utilises the best available technology to determine the quality of a RCF bale and producing the most valuable data to the customer.

PTS developed the PBS-sensor that produces reliable data besides for moisture, also for the contents of plastics, ash and the relationship of mechanical & chemical pulp present in the bale.

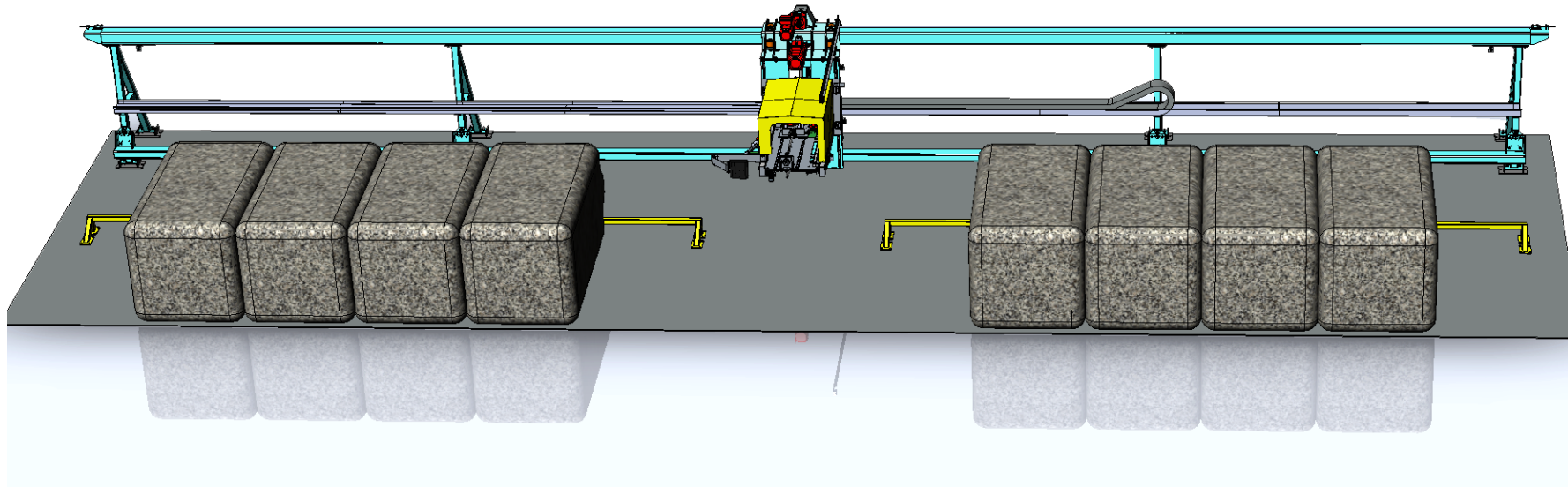
This allows for a very sophisticated management of not only the raw-material suppliers, but also of the storage of the material to your backyard and synchronising the material qualities with your production needs better than ever. The experience is, that the benefits achieved in process advantages and safety against excess loads of for instance plastics delivered are undisputed.

The system itself is made as standardised as possible and can be built to match most factory standards - within reason of course.

As standards, we use the following components:

- PLC - core system Simatic S7 - 1200, Profinet
- PC-server Per PTS specification
- Laser sensors: Sick, Schneider
- Metal detection sensors: Sick
- Absolute position encoders: Sick
- Frequency inverters: Siemens with Profinet
- Motors: Nord Gear or SEW
- On-Off task linear motors: Thompson Linear or equivalent DC
- Cabling: Industrial specified to -25C
- Coatings + colours: Industrial, customer spec. color
- Metal works: Standard industrial class
- Remote connection: Tosibox, comes as standard

- + Calibrated data for moisture, plastics, fibers & ash
- + Automatic, operated only by the forklift drivers
- + Simatic S7 PLC with multilingual user interface
- + Optional remote control by a radio system
- + The best NIR-analytics available on the market
- + Easy to maintain & service, automatic calibration
- + 2nd generation system with many improvements



Basic principles

The basic system configuration is run by having a forklift push the bales against a buffer on the ground and then start the testing. This simple procedure ensures many things like bale positioning, direction of the bale, direction of the binding wires, a non-slipping surface for the bale, rain protection, the required measuring sensor calibration etc.

Bale positions and sizes are determined and the bales are then tested. A high power driller makes a hole into which a sensor developed by PTS-Papiertechnik is then applied. The measuring data is automatically forwarded.

For best speed, the customer should use a standardised loading procedure, but naturally the number of bales can be change and the sizes may vary as long they inside specified limits.

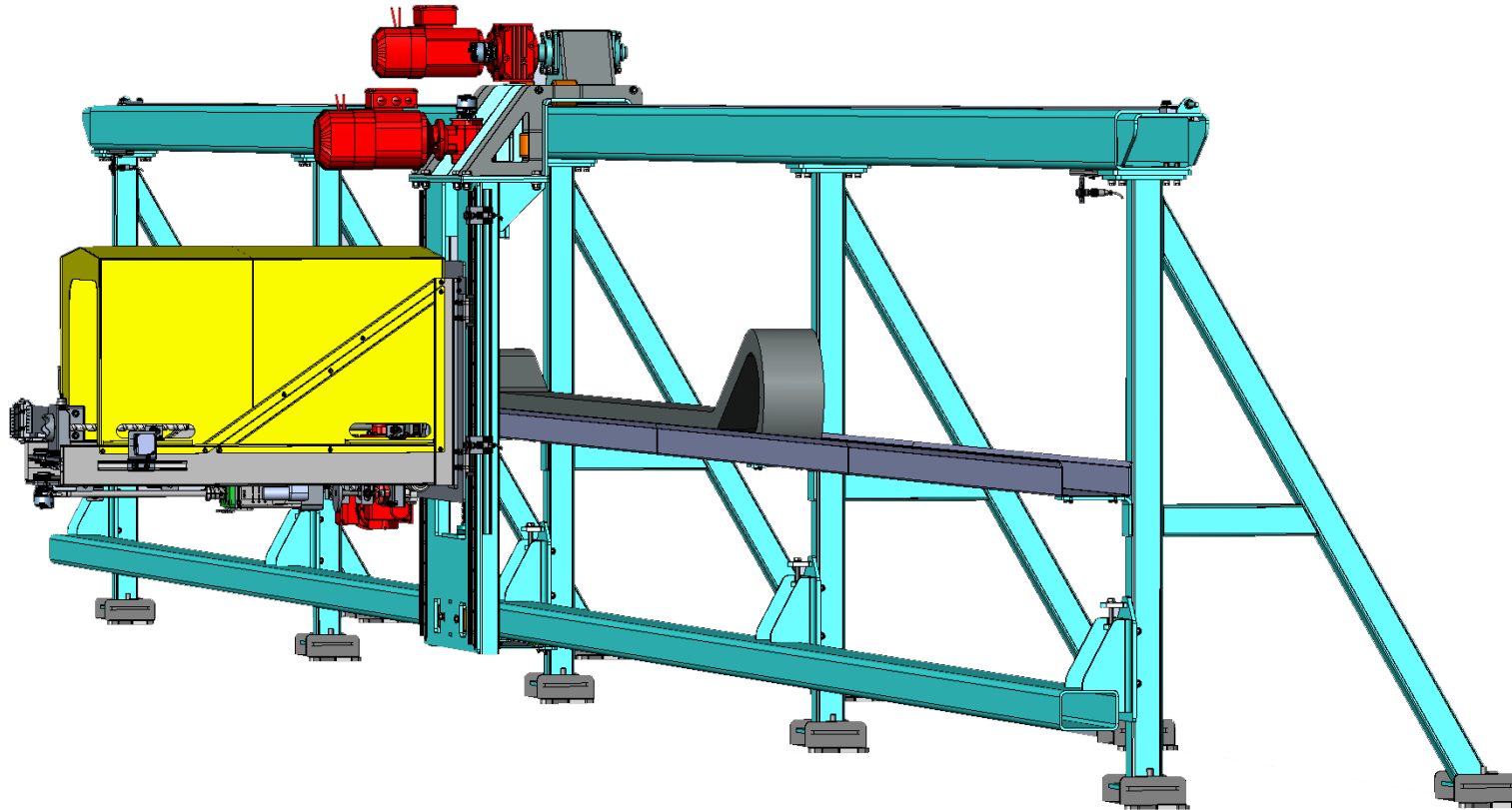
High Capacity systems - larger area installation

When looking for running 400-500 tests in 24 hours, then capacity increasing is done easiest by constructing a system with two loading areas. The active time is maximised by having the testing is running on one area while the other area is being loaded / unloaded.

Both areas have their own independently working safety systems and sample ID - systems.

The double area system should be able to do 400-500 bales per day, all depending on the contents of the bales. Naturally, if car engines or glass-fiber mats are inside the bales will cause stops and drill-bit changes.

This system layout allows for buffering & flexibility in the logistics and use of resources.



Fast Plug+Play project for efficiency

The system is constructed in ready blocks making the erection as fast as possible. The mechanics optimally matched to the tolerance demands of the testing procedure and the circumstances in the field thus generating an easy-care, reliable working system. The system is set up at Haarla, trial runned, FAT - inspected if so desired and then shipped to the customer in large as possible modules.

Rain/snow cover is needed

For the the standardised safety sensing systems to work and also protecting the water-measuring sensor not to get disturbed by rain, the testing area needs to be covered by a roof. It is quite basic environmental protection of a measuring system producing data worth much money. No moisture measuring solution is reliable in rain and roofing & wlls are therefore needed.

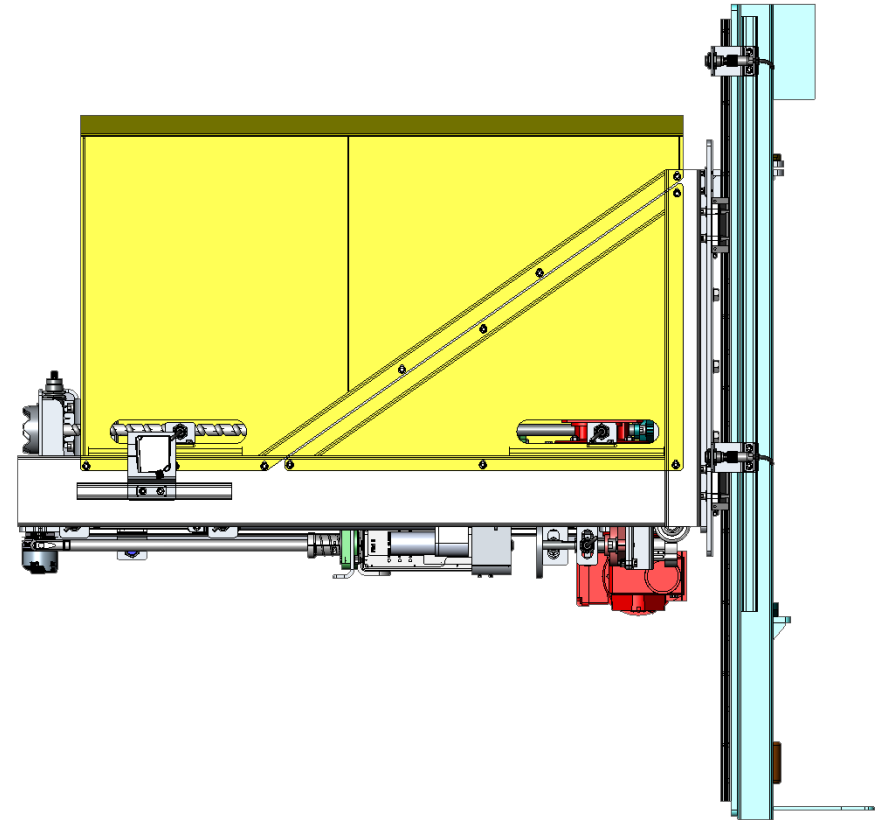
Haarla Engineering can organise for a "ready roof" supplier to deliver the needed roofing, structures and arrange for local resources for the erection. Typically the "construction works" ie. making of the concrete foundation including the attachments as per a footprint drawing from us and the roofing belongs to the customer. The site needs to have ethernet connection, power and if possible non-critical pressurized air (used in small amounts for cleaning purposes on the sensor etc

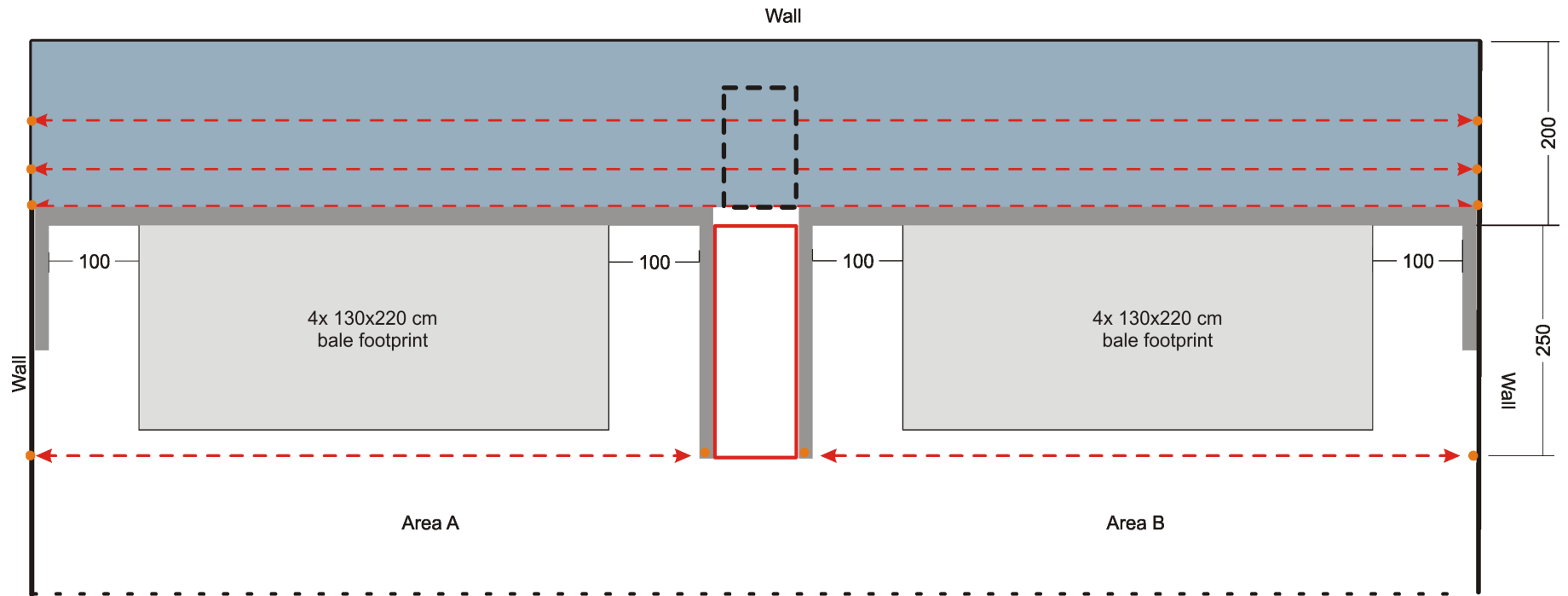
Compact system core easy to integrate

After testing tens of thousands of tons with the pilot system, we re-designed the system core to be a very compact unit. Mechanics are engineered to be robust and as service-free as possible.

The moving Balemat core is now a very compact unit full of intelligence and high-end industrial components ensuring that it does the job it is intended to do.

Despite the size, it is very powerful... over half a ton of drilling force and more than 100 nm of rotating drilling torque... combined with hard steel drillers, it should be able to penetrate anything what is inside the bales... unless there are stones or car engines inside.





Full safety features, modularity and flexibility

- The layout allows for excellent safety features to be built in the system.
- The sizing is very easy to modify without relevant changes in the price of the project. Here a 4+4 bale testing area system is being described, but typically a 2-3 bales per load testing routine has been seen as adequate. The system speed surpasses that of manual testing many times over and as the insides of the bale is tested, no sampling error occurs due to extreme weather etc.
- The system can be made to work very fast with fixed bale numbers set from the user interface. For instance, select the standard tested number of bales = 4 and then just keep on loading the system with 4 bales in each area and the system scanning / analytics time can be reduced to zero and very high speeds are possible with fixed position sensors being applied.

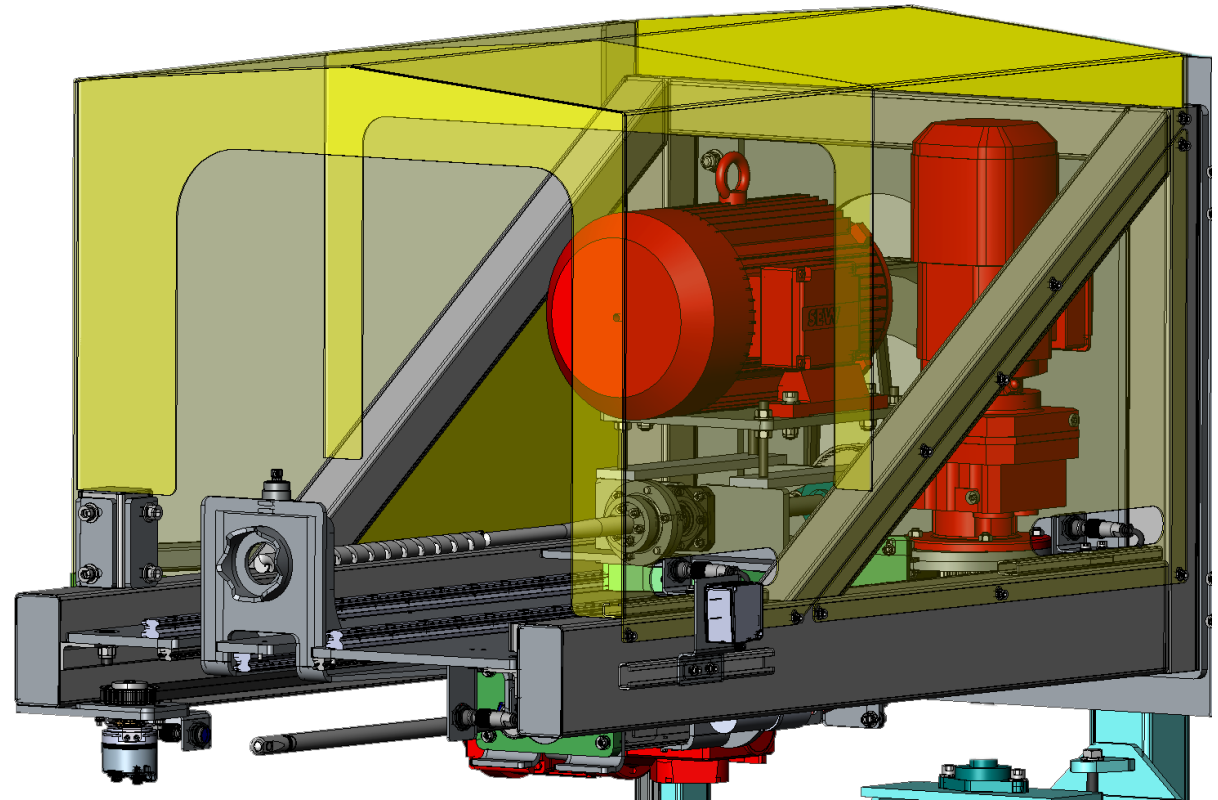
Now with a very manageable and affordable drilling solution including bale surface stabilizing during the drilling, hole cleaning cycles and very easy access to all components.

Protective on all the critical components, easy to access.

Haarla Designed "Dust-trap" -type of optical calibration standard manipulator allows for trouble-free and reliable operation even in the hardest conditions.

Custom made High-grade steel drillers with Stellite tips are run in at the moment for increasing driller force - & wear resistance for high capacity systems. The drillers are serviceable / re-toolable in most cases.

Haarla did try with 800 euro costing core-type of tube drills, but we soon realised that the costs of the drills and the risk of losing such a drill due to metal, stones etc. in the bales was just too big.



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