

The background of the slide is a photograph of a modern, multi-story building with a curved facade and a glass base, situated on a waterfront at night. The building's upper floors are illuminated, and its reflection is visible in the water. To the right, a brick building with arched windows and street lamps is also visible. The overall scene is a mix of modern architecture and traditional urban elements.

RUUKKI

Ruukki Construction introduction

Building your tomorrow

- sustainability
- intelligence
- digital information
- measurements for life cycle
- about digital twins

We make steel-based products for walls and roofs, for both commercial buildings and private homes.

*We're a supplier of high-quality products and services, systems and solutions
- developed sustainably and to live up to the highest demands on durability in harsh conditions.*

Ruukki Construction is part of SSAB

SSAB main production in Sweden, Finland and US

65 BILLION
SEK

annual net sales in 2020

Steel making since

1878



14,000
professionals
in 50 countries

Annual steel
production capacity:

8.8 MILLION
TONNES

SSAB BUSINESSES:

SSAB Special Steels,
SSAB Europe,
SSAB Americas, Tibnor,
Ruukki Construction

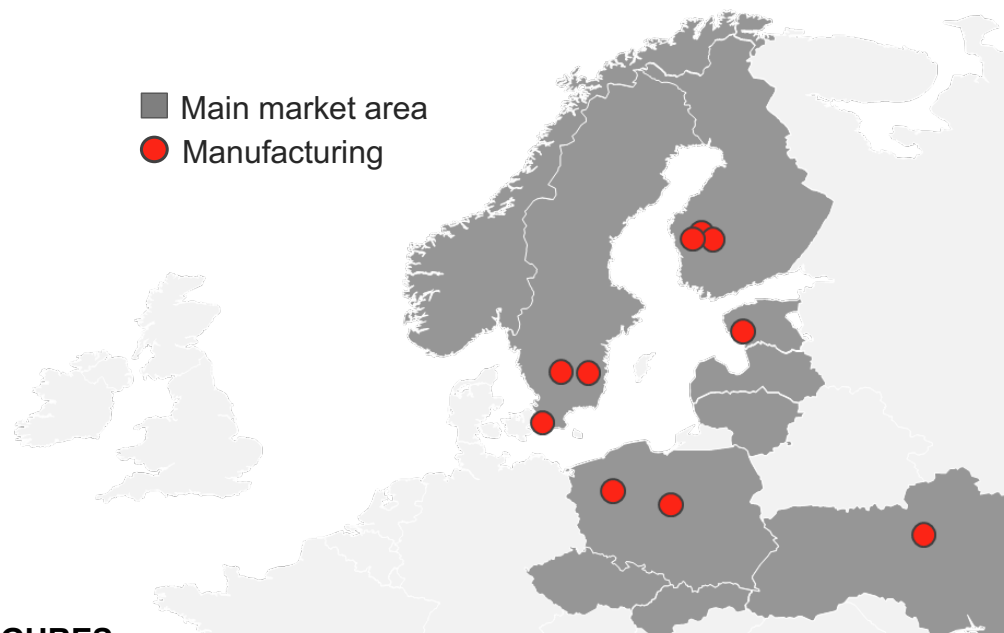
Ruukki Construction product business at a glance

NET SALES BY BUSINESS



Main brands Ruukki and Plannja

■ Main market area
● Manufacturing



FACTS & FIGURES

470

Net sales 2020 €m *

10

Manufacturing sites

1 400

Personnel

54

Net Promoter Score

We serve customers in many fields and cooperate with several stakeholders

Roofing

Roofing sheet



Tin smith roofs



RWS



Roof safety

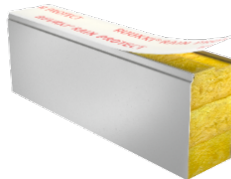
Flashings



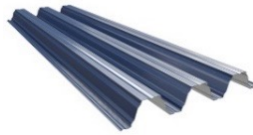
- Single family houses
- Multi-family houses
- Commercial buildings

Building Envelopes

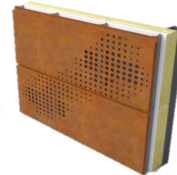
Sandwich panels



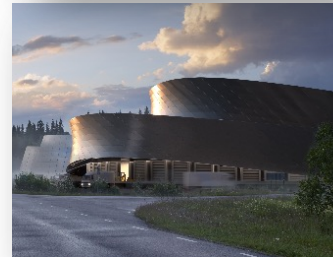
Load-bearing sheets



Design profiles and facades



Solar facade



- Logistics centers
- Commercial, industrial and office buildings
- Sports halls and stadiums

Examples of roofs in renovation projects



Ruukki Monterrey roof, Finland



Plannja traditional profile roof, Sweden



Ruukki Monterrey roofs, Finland



Ruukki Monterrey roofs, Finland

Examples of roofs on one family houses



Ruukki Classic and tinsmith roofs, Housing Fair, Finland



Plannja Flex roof, Sweden



Ruukki Finnera roof, Poland



Ruukki Hyygge roof, Poland

Examples of roofs on commercial buildings



Ruukki tinsmith roof, Amsterdam hotel, Netherlands



Ruukki Finnera on Gym and cultural house , Czech



Plannja standing seam roof, Kungsporthuset, Sweden



Plannja standing seam roof ,Sweden

Examples of office buildings



Primo office building, Gotenburg, Sweden



Events Business Garden, Espoo, Finland



Tuglase Business Centre, Tartu, Estonia



Zerva office, Skövde, Sweden

Examples of public buildings



European Solidarity Center, Gdansk, Poland



Hamina Campus, Hamina, Finland



"Rheinvorlanspeicher", Mannheim, Germany



Maritime Centre Vellamo, Kotka, Finland

Examples of sport halls and stadiums



Rumbula sports centre, Riga, Latvia



Malmö Arena, Malmö, Sweden



MALTA Multifunctional Hall, Malta, Latvia



Elenia Areena, Hämeenlinna, Finland

Examples of commercial buildings



Centrum Galaxy, Szczecin, Poland



Bory Mall shopping centre, Lamac, Bratislava



Eeden shopping and leisure centre, Tartu, Estonia



MAN service and client centre, Riga, Latvia

Examples of logistics centers



DHL Business Park, Vantaa, Finland



DHL logistics centre, Oulu, Finland



Logistic centre, Kaunas, Lithuania



Årsta crossdock terminal, Stockholm, Sweden

Examples of industrial buildings



Metsä Group's bioproduct mill, Äänekoski, Finland



Fortum heat and power plant, Klaipeda, Lithuania



Vantaa Energia, waste-to-energy plant, Vantaa, Finland

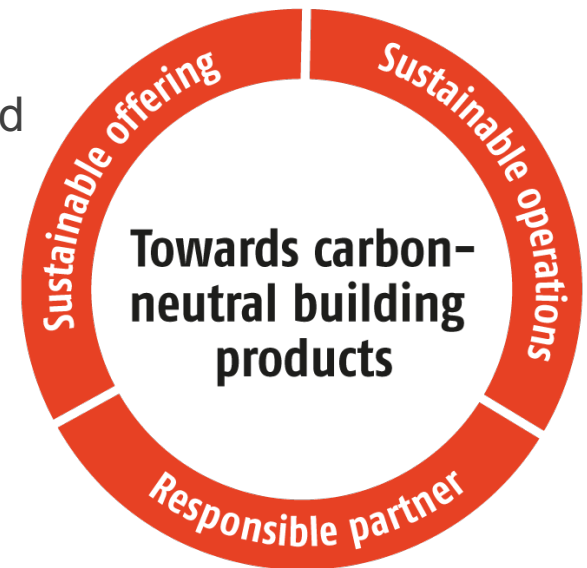


SYSÄV heat and power plant, Malmö, Sweden



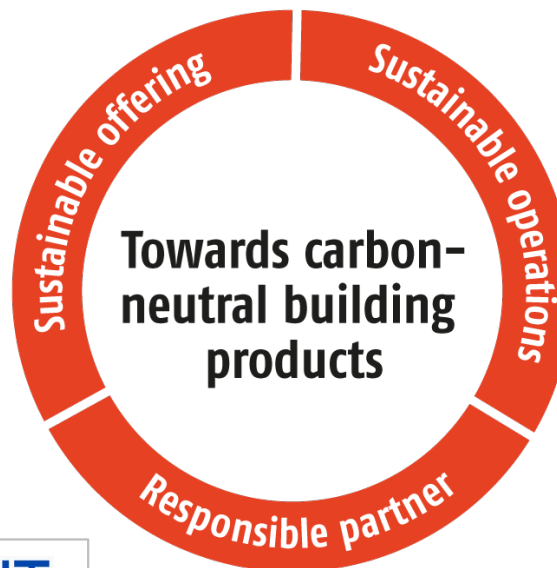
Our sustainability promise: Towards carbon-neutral building products

- Our ambition is to deliver carbon-neutral building products, through emission reductions in our offering and operations.
- Important is also that we aim to be a responsible partner through high ambitions within safety, employee engagement and customer satisfaction.



How to achieve carbon-neutral building products

- **Steel is 100% recyclable**, the most recycled material in the world
- Light and long-lasting products, with **guarantees of up to 50 years**
- Ruukki's envelope solutions provide up to **30% of energy savings**
- **First building products based on fossil-free steel in 2026**, will reduce carbon emissions by around 85%



- By 2026, we aim to **reduce carbon emissions by 25% in our own operations**
- **Reduced waste and scrap**
- Increased use of **fossil-free energy**
- **Optimized logistics** close to customers

Sustainability is a business strategy. **HYBRIT**
Pilot plant fossil free steel produced 18.8.2021. **FOSSIL-FREE STEEL**

Cutting CO2 emissions in Sweden by 25% by as early as 2025. 2030-2040, the plan is to convert the blast furnaces in Luleå, Sweden and Raahе, Finland to eliminate most of the remaining CO2 emissions. The company's operations will be powered by renewable energy by 2022. America's operations will also be able to offer fossil-free steel products starting in 2026, utilizing the sponge iron developed using [HYBRIT technology](#). At the same time phasing out fossil fuels used in rolling mills and heat treatment plants throughout the company, to reach the goal of becoming fossil-free by 2045.

- **The safest company** to work in building products industry
- **The most engaged employees** in the industry
- **The most satisfied customers** in the industry

How to achieve intelligent building

Component intelligence

- Light and long-lasting **reusable and recyclable** products
- Information, testing, suitability, material traceability,...

Intelligence in operations

- optimized logistics close to customers
- The safest company, the most engaged employees in the industry. Most satisfied customers in the industry
- Reduced waste and scrap
- Driver in reduction of fossil fuels. Sustainability is a business model.

Building envelope intelligence

- Design of whole - more than a single product can achieve. Components are enablers.
- Today "digital helpers" and information is for design and our first customers (like MyRuukki services)
- Digital helpers development for building usage time is based on product knowledge and materials used.

Part of Ruukki building components intelligence is product light weight and easy assembly and disassembly.

Need and purpose of building may change or end before its technical lifetime. Reusing material and components instead of recycling can reduce carbon footprint considerably for new operations.

Fully realizing this hidden value and opportunity there is need to identify the parts, have knowledge usage history and conditions.

As with used car business the value depends on model quality records, body number, service history and mileage records. If information is missing used car market value will drop around its material content and recycling value.

Here is a clear opportunity for digital information and monitoring efforts to make difference and pay back in long term.

Unique product ID is likely a method to deliver more value from desing phase to later usage phase.

Digital information feed for intelligence

Dimensioning software

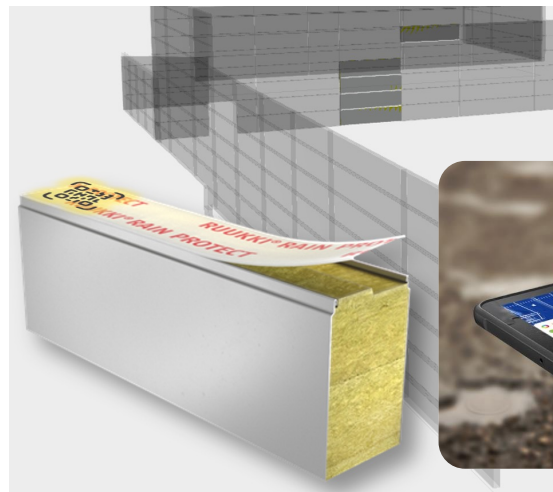
Simulations (like optimized energy simulations)

BIM-models

Manufacturing information

Delivery and logistics

Assembly instructions

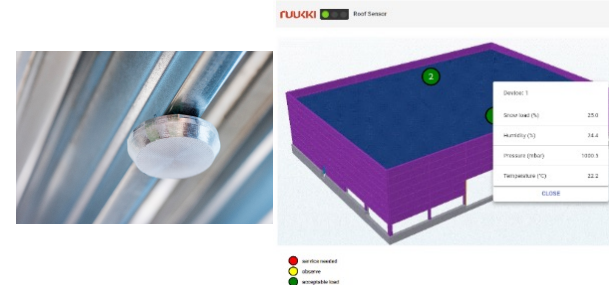


**MyRuukki
services**



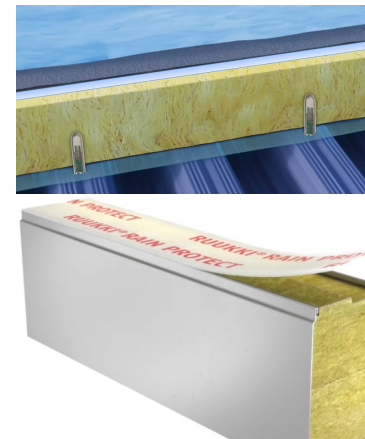
Data from ready made buildings:

Local weather and BAS are main sources
-additional measurements added if needed



Available for load
bearing roofs:

**Ruukki® Roof
Sensor**



From research:
- active RFID asset
tracking and micro
location used for long term
monitoring (like water
leakage, intrusion)
security,...)

From research: active RFID with UWB impulse radio

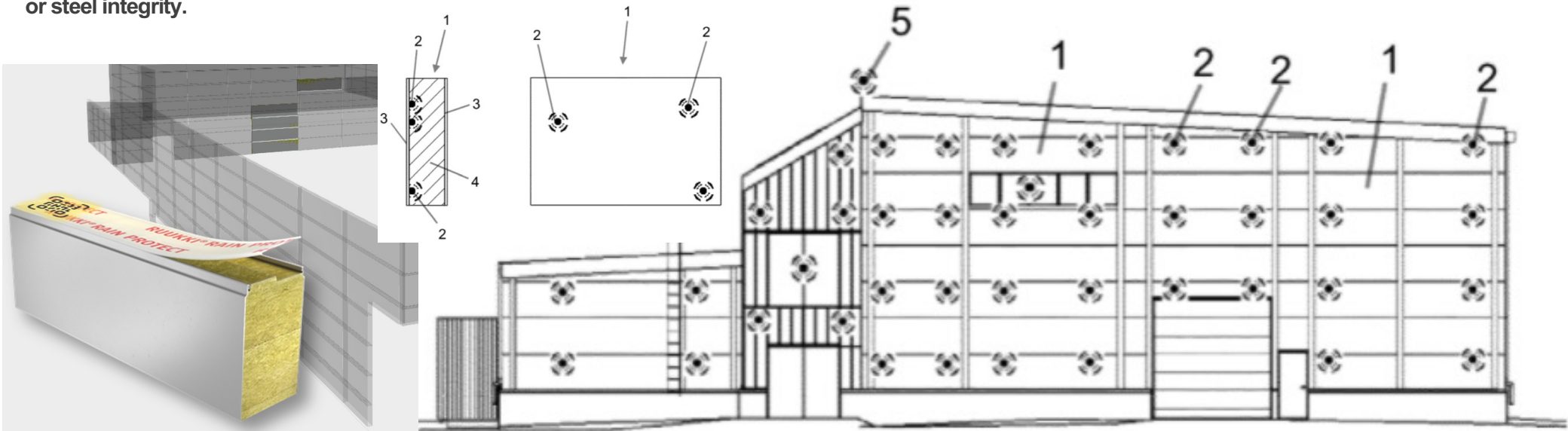
automated ID (asset arrival, inventory, location, etc)

contact-free monitoring method for a long term an large areas (leaks, intrusion detection, etc)

Basic operation:

Short radio message is sent and its bouncing inside structure through insulation material. It is received from other transceivers in structure.

From impulse response of coded signal is analyzed and compared if there is any changes. Presence of water is detected, or any other change in reflections or steel integrity.

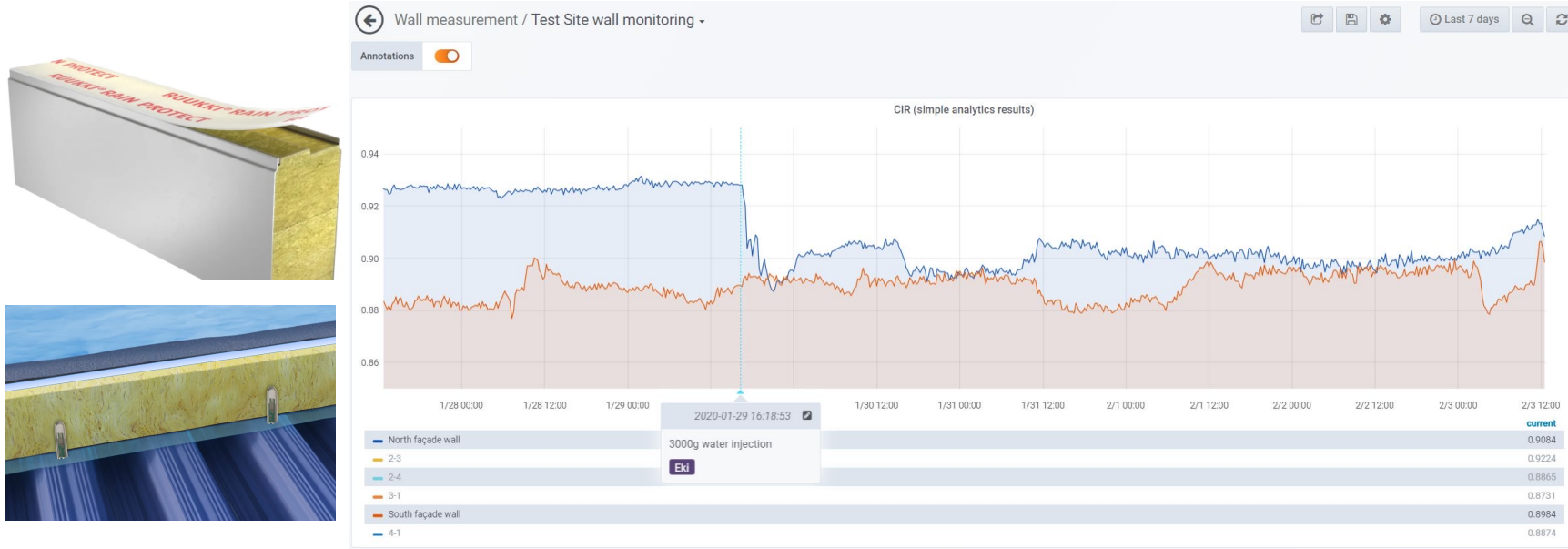


<https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2016120445&tab=PCTDESCRIPTION>

Most efficient when integrated to new products acting as identification. Hard to counterfeit for example.
Can be post-assembled to buildings as a separate product (market sector would be some different). Much less devices are needed.

Research example: active RFID for long term monitoring

Until now no better than humidity measurements has been available. Humidity measurement in air is not what we really want to know. It is slow and needs a long time to have a balance with insulation material and fluctuating temperature. We want to detect liquid water - sooner the better.



Instant detection of water leak in test field building.

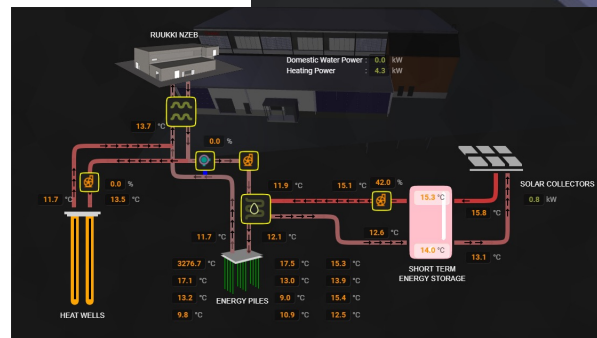
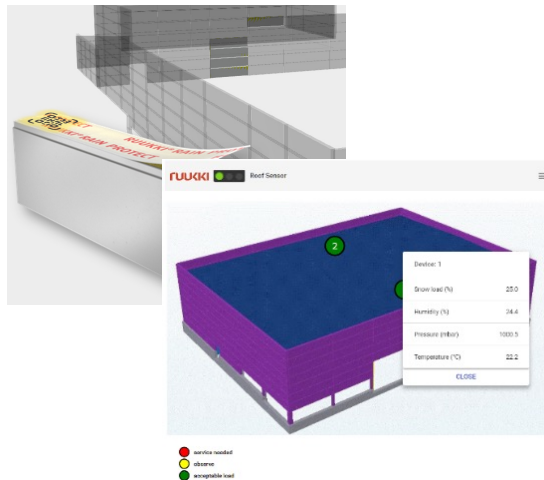
Measurement curves from two walls by received signal simple analysis.

-In south wall (red curve) the higher daily variation reason is caused by higher solar radiation and temperature effects.

Presenting analyzed results and history data with shared digital twins presenting parts and operation

For general availability of digital twin there is big question how to automate creation of digital twin from information silos and how to update it.

With information collecting product ID system the building is carrying its history and aware of its environment... Spime?



Conclusion from research and development

Manufacturer point of view of building envelope, parts and data today

- Efforts made mainly to fulfill our first customer processes and interests - of course. Lots of data produced in design and manufacturing phase and delivery process can be utilized even more.
- Generally demanded data at hand over is a snapshot of a delivered and assembled product(s).
 - Warranty period of products and design is 10 years.
 - Buying customer interest can be much shorter than a product warranty time.

“Responsibility cycle” vs. building life cycle: buildings lasts for much longer time than 10 years.

- Ruukki sees some own interests and value for data from monitoring building usage time
 - Communication through intelligent products with future building owners and managers (likely not our first buying customers)
 - Renovation needs, spare parts, etc: present processes would save time and improve services and reaction.
 - R&D product feed back channel: follow up of products in real environment in long term beyond 10 years. Presently there is many separate test sites for materials and coatings
 - Monitoring products opens up extra values like improved communication and reuse instead of recycling (saving further resources).

There is knowledge and means to reach beyond present expectations.

- additional information that can be used in long building usage time
 - Ruukki® Roof Sensor, operation is based on material knowledge, design information and local sensors.
 - Presented example invention to tackle most needs in long term with active RFID. Searching for suitable co-operators and stakeholders.

Seems that Ruukki can provide many solutions but can't efficiently implement all things by itself as present market is cost sensitive concentrating on product initial price.

- There is a need for long term co-operators, integrators and players to utilize available data and information for full building life cycle. This is why we contacted BaseN in a first place already in research and study phase.

RUUKI

Building your tomorrow.