“BUILD SMARTER – CHOOSE THE HSE FLOOR.”

A durable, recyclable flooring system that saves time, minimizes risk, and creates professional, safe working environments

“This project is carried out in close collaboration with a leading residential developer to create innovative and sustainable housing solutions.”

IP Group
Intelligent Packaging

www.ip-group.com

INTRODUCTION AND BACKGROUND

"An initiative from a leading residential developer has led to the implementation of this study."

HSE Floor – the smart protective underlay that elevates the entire construction site

Today, temporary structures, such as plywood sheets combined with expanded metal, are used to create walkways, platforms, and surfaces in front of elevators, entrances, and on rooftops. This has worked, but comes with several challenges:

Safety: Plywood becomes very slippery in rain, snow, and ice. Expanded metal is laid on top to reduce the risk, but this makes the solution more time-consuming and costly.

Durability: Plywood handles moisture and cold poorly. The sheets swell, break, and lead to extra costs, waste, and increased accident risk.

Time consumption: Large sheets (120 × 240 cm) do not adapt well to uneven surfaces, creating trip hazards. Regular inspections and repairs are necessary. Installation and removal are time-intensive.

Costs and waste: When the structures are no longer needed, they are often discarded as residual waste. Expanded metal is rarely removed because it is perceived as time-consuming. The result is unnecessary material costs, high waste volumes, and poor environmental performance (kg/BTA).

Unpredictability: Construction sites are affected by clay, snow, water, and uneven surfaces. Current solutions are heavy, difficult to adapt, and inflexible.

In short: today's solution is costly, unsustainable, and creates a high risk of slippery and unsafe working conditions.

PROPOSAL: IMPLEMENT THE “HMS FLOOR”

We propose replacing the current solution with the HMS Floor, developed by IP-Group. It is a modular flooring system made from recycled plastic, specifically designed for high durability and flexibility in demanding environments.

Applications:

- In front of transport elevators and entrances: Prevents dirt from entering buildings and creates clean, safe access routes.
- For customer inspections: Clearly defines walkways and gives a tidy impression in areas that are not yet completed.
- Improved accessibility: Makes it easier for elderly people, strollers, and visitors to move around.
- On finished roofs and insulated surfaces: Protects delicate roofs from damage caused by traffic, equipment, or tools. Can also be used as protection during hot work.
- As a platform and walkway: Especially useful on ramps and near construction elevators.
- Underlay for deliveries: Provides a stable, continuous transport path from loading points to entrances/elevators, regardless of terrain.
- Temporary walkways on snow, water, or grass: Marks clear walking zones, ensures safe passage, and facilitates equipment transport.

HSE Floor – safe, durable, and flexible. The smart choice for any construction site!

BENEFITS OF THE HSE FLOOR

HSE and Safety:

- Slip-resistant, even in snow, rain, and ice.
- Safe, even surfaces for employees, suppliers, customers, and heavy equipment.
- Reduces the risk of falls and trip hazards.
- A unified standard across all construction sites makes HSE monitoring easier.

Efficiency and Resource Utilization:

- Quick and easy installation and removal.
- Modular panels can be adapted and cut as needed.
- Less time-consuming than plywood and expanded metal.
- Follow-up and relocation are significantly easier than handling old, swollen plywood sheets.

Durability and Environment:

- Made from recycled plastic.
- Can be recycled again if damaged.
- Reduces the use of disposable materials (wood and metal).
- Significantly less waste, contributing to lower kg/BTA.

Economy:

- In the long term, renting the HMS Floor is cheaper than current disposable solutions.
- Less residual waste reduces waste management costs.
- Faster installation and removal saves labor time.
- Longer lifespan → better overall economy.

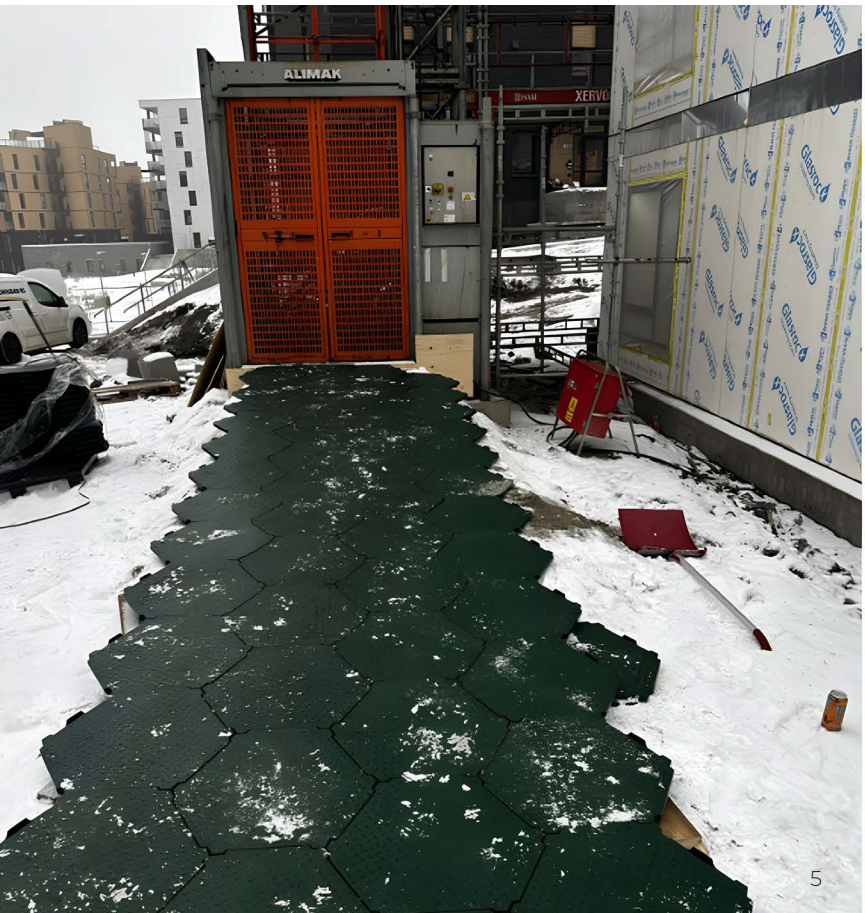
BENEFITS OF THE HSE FLOOR

Professional Impression:

- Modern and tidy protective flooring.
- Creates a professional appearance on the construction site for customers, suppliers, and employees.

Sustainability Profile:

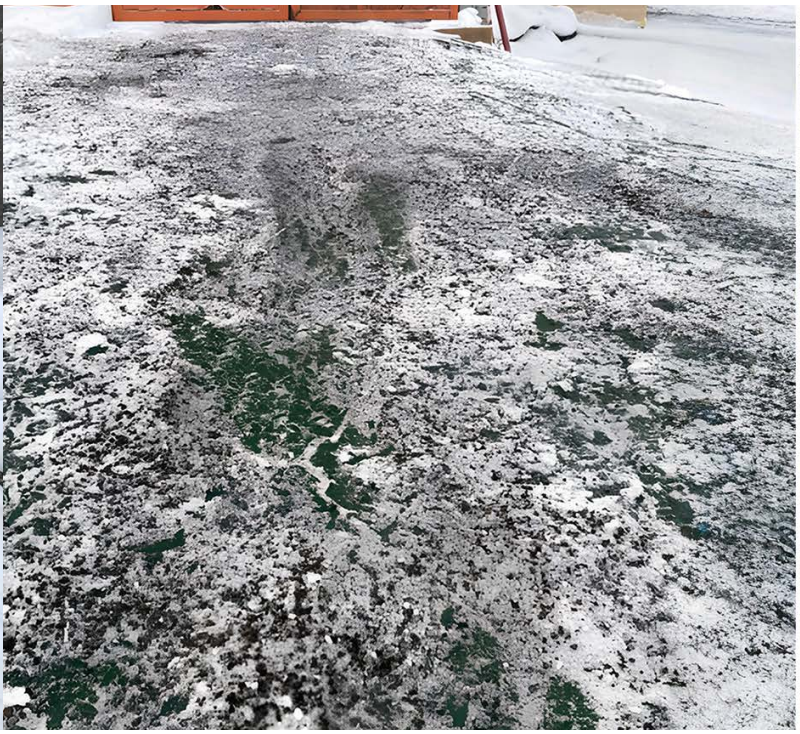
- Supports the company's sustainability strategy.
- Clear contribution to the circular economy.
- Based on the PPP principle – People, Planet, Profit: when all three aspects are addressed, the solution is sustainable over time.



DURING WINTER:

During winter, standard snow removal applies – snow and ice are easily cleared. Ice releases easily and does not stick to the floor panels, unlike plywood and expanded metal, where snow and ice merge to create a slippery and hard-to-manage surface. With the HSE Floor, you get a surface that remains safe, practical, and easy to maintain – even in harsh winter conditions.

SLIP-RESISTANT



Several tests have been conducted with different anti-slip materials – sand, gravel, crushed stone, and salt. The material that showed the clearest effect was LECA pellets. They provide significantly better grip, are easy to handle, and perform optimally on the HSE Floor under challenging winter conditions.

A slip-safety study has also been conducted on film, allowing real-time observation of how conditions change under different weather and wind conditions. This provides a clear and practical visualization of how the HSE Floor performs in real-life situations.

ESTIMATED COST AND CO_2 SAVINGS

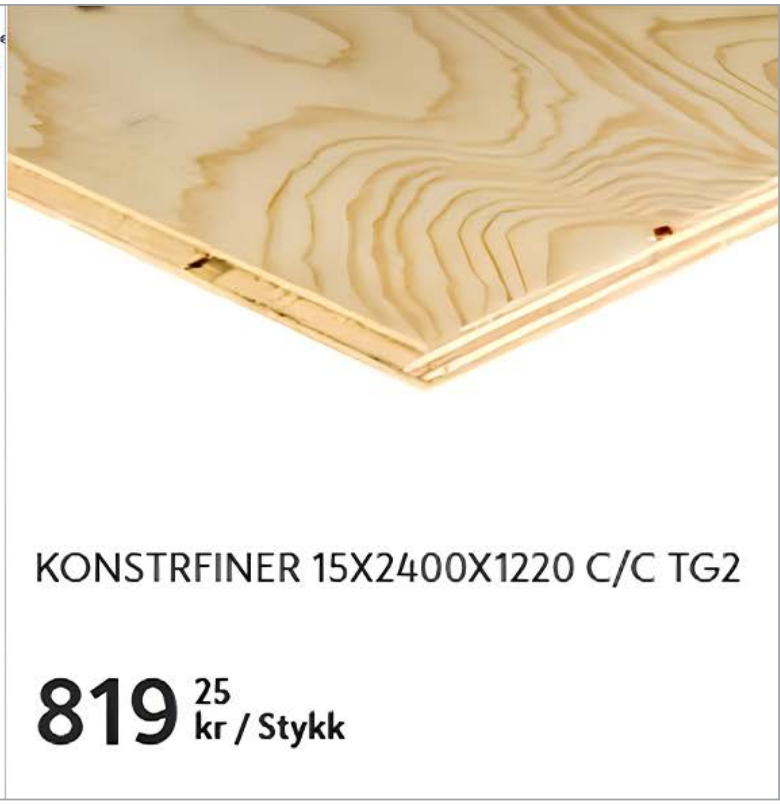
1. Background

This document presents an updated calculation of the cost and climate impact of switching from the current temporary ramps (plywood + expanded metal) to a reusable HSE Floor, owned, stored, and managed by the residential developer. The calculations are based on technical datasheets for HauCon expanded metal and typical weights for Moelven construction plywood.

2. Assumptions

Activity:

- 4 projects per year
- 5 years → total of 20 projects
- Requirement per project: 200 m² of HSE Floor



ESTIMATED COST AND CO_2 SAVINGS

Current Solution (Disposable Materials):

- 200 m² plywood + expanded metal per project
- Cost per project: NOK 79,708
- 20 projects → total NOK 1,594,160

New Solution – HMS Floor (Reusable):

- One-time purchase: 500 m²
- Price: NOK 350/m²
- Investment: 500 m² × NOK 350 = NOK 175,000
- Maintenance and replacement over 5 years: NOK 25,000
- Total estimated cost over 5 years: NOK 200,000

Economic Savings:

- NOK 1,594,160 – NOK 200,000 = **NOK 1,394,160 saved over a 5-year period**

Material Use (Adjusted Weights)

Expanded Metal (HauCon Strekkmetall Steng 10 mm):

- 1 kg/m²
- 200 m² × 1 kg/m² = 200 kg (0.2 tons) per project
- 20 projects → total 4 tons

Plywood (Moelven Construction Plywood 15 mm, approx. 21.9 kg/sheet):

- Plate size: 2400 × 1220 mm = 2.928 m² per sheet
- Weight per m²: 21.9 kg ÷ 2.928 m² ≈ 7.48 kg/m²
- Per project: 200 m² × 7.48 kg/m² ≈ 1.5 tons
- 20 projects → total: 29.9 tons

- **Total disposable material avoided: approximately 33.9 tons**

ESTIMATED COST AND CO_2 SAVINGS

4. CO_2e Calculation (Materials):

Factors:

- Steel: 2.0 tons CO_2e per ton
- Wood: 0.4 tons CO_2e per ton

Emissions:

- Expanded metal: 4 tons × 2.0 = 8 tons CO_2e
- Plywood: 29.9 tons × 0.4 ≈ 12 tons CO_2e

Total material-related reduction: approximately 20 tons CO_2

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5. Transport and Waste

Assumptions:

- 40 waste pickups over 5 years
- Total waste: 33.9 tons
- Cost per trip: NOK 1,095
- Processing cost: NOK 650 per ton

Average load: 0.85 tons per trip

- Cost per trip: NOK 1,095 + (NOK 650 × 0.85) ≈ NOK 1,646
- Total cost: NOK 1,646 × 40 ≈ NOK 65,900

CO_2 from Waste Transport:

0.08 tons CO_2 per project × 20 ≈ 1.6 tons CO_2

Reduction with HSE Floor:

Approximately NOK 65,000–70,000 saved in waste and transport costs.

ESTIMATED COST AND CO_2 SAVINGS

6. Overall Impact (5 years, 4 projects/year)

Costs:

- Current solution: NOK 1,594,160
- HMS Floor: NOK 200,000
- **Savings: NOK 1,394,160**

Materials:

33.9 tons of disposable material avoided

CO_2:

- 20 tons CO_2 reduced (materials)
- 1.6 tons CO_2 reduced (transport)
- Total: approximately 21.6 tons CO_2

Transport and Waste:

- 40 pickups avoided
- NOK 65,900 saved in transport and processing costs

Operations and HSE: :

- Standardized, safe solution
- Less assembly/dismantling and lower risk
- Simpler project logistics for the residential developer

7. Final Assessment and Conclusion

By investing in 500 m² of HMS Floor, the residential developer achieves:

- 1.39 million NOK saved over 5 years
- 33.9 tons less disposable material
- 21.6 tons of CO_2 saved
- Significant reduction in transport and waste
- Improved HSE and more efficient project execution

This provides a solid foundation for implementing the HSE Floor as the standard solution!

Headoffice

IPG Intelligent Packaging Group AB
Skallebackavägen 24, 302 41 Halmstad
Sweden
Tel: +46 35 102480
info@ip-group.se
www.ip-group.com