

OWOW-OP09.04-EHS 010-P03 Skanska UK Human Form Recognition Standard

# Skanska UK Human Form Recognition Standard

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## 1. Introduction

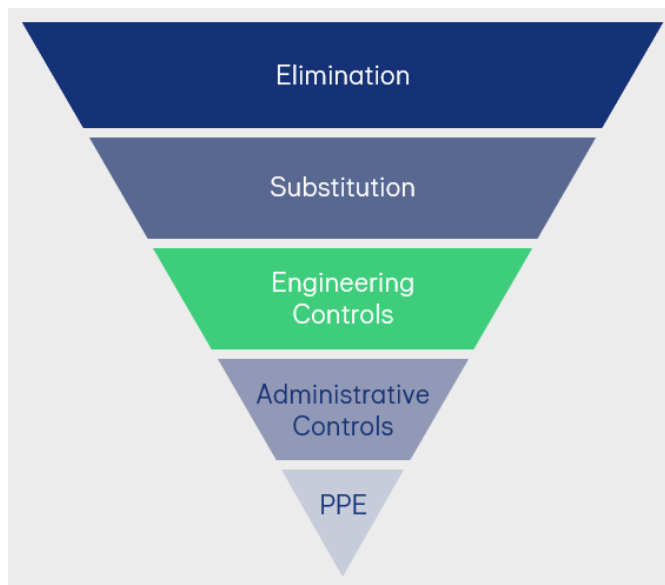
People plant interface represents one of the biggest risks and causes of potential fatalities on construction sites in the UK. Skanska UK recognises that technology has a part to play in reducing the risk of these incidents occurring. The primary focus of this document will be to outline how Human Form Recognition (HFR) camera technology will be implemented on Skanska UK's projects and sites to reduce accidents and incidents.

This document will outline the Skanska UK standard for HFR, which will be fitted to items of mobile plant that pose a people plant interface risk to workers. It will detail the in-scope plant, standards that equipment should meet along with the functionality required, and considerations for training and GDPR compliance.

The content draws heavily from the work that has been done by other tier one contractors within the UK construction industry and aims not to contradict the standards of other organisations. This reduces the likelihood of there being multiple conflicting standards within the industry and thereby reduces complexity and costs for supply chain partners and suppliers.

## 2. Hierarchy of Control

HFR Camera technology is an engineering control within the Hierarchy of Control that is designed to notify both plant operators and operatives when persons come into close proximity of working plant.



Engineering controls seek to design the workplace or equipment to reduce the risk of the hazard. HFR is a technological engineering control that seeks to reduce the risk of injury to persons from contact with moving plant.

It is important to note that while engineering controls are effective in reducing risk, they are not enough on their own to manage the risk down to an acceptable level, and other control measures must be employed in combination to ensure effective management.

## 3. Scope

**The minimum mandated list of in-scope plant is currently limited to 13t and above excavators and piling rigs.**

However, most types of mobile plant can be fitted with HFR systems, and it is expected that projects will assess the risk posed to workers from work activities and employ HFR wherever it presents an opportunity to mitigate risk of injury, but on all 13t and above excavators and all piling rigs as a minimum.

For other types of plant, HFR may not be appropriate in all settings and therefore, may be risk assessed out in favour of other control measures, but this should be done as an exception, rather than the rule. See guidance in [Appendix 1](#).

The scope of this policy is not as broad in scope as other contractor's policies in terms of types of plant but is designed not to directly contradict other policies. This ensures that suppliers and manufacturers have consistency in the equipment they are being asked to provide to their clients.

It is intended that the minimum mandate of this scope will expand in due course to cover a wider range of plant, once successful implementation is demonstrated.

## 4. Functionality

HFR camera systems should be able to detect human forms and communicate the detections visually and audibly to the operator of the mobile plant, as well as audibly to pedestrians that have been detected. The system may be modular and should be able to be installed on various types of mobile plant.

Fail-safe controls that trigger an alert to the operator and to remote personnel in the event of any component failure or tampering, such as broken wires or camera failure.

Zero blind spot areas in the detection zones to ensure that all potential hazards are detected.

A remote interface or web-based portal that allows managerial, supervisory and office-based personnel to easily view and review the data collected by the camera system, subject to acceptable GDPR compliance.

### 4.1. Visual and Auditory Feedback

The functionality required of HFR requires visual and auditory feedback with clear distinctions between the different states that they denote. Visual and auditory signals should be used in concert to allow for individual and environmental conditions which may impact on a person's ability to detect the warnings, e.g. audio warnings for when persons are facing the other way, coloured pictographic signage to allow for those who do not speak English as their first language and lit visual displays for low light conditions.

The distance that a person is from plant equipped with HFR technology will denote the action that the equipment takes. The action taken will change and escalate the closer the person gets to the machine, for example moving into the outer zone and then the inner zone.

#### 4.1.1. Audible Alarms when pedestrian detected – Inside the cab:

HFR Outer Zone

- Subtle audible alert (such as beeps), non-repeating.
- If another person entered the zone, driver will be alerted by beeps again.

HFRC Inner Zone

- Spoken alarm "Person Detected" or similar, non-repeating.
- If another person enters the zone, driver will be alerted again.

#### 4.1.2. Audible Alarms when pedestrian detected – Outside the cab:

HFR Outer and Inner Zones

- Spoken alarm to state "Danger - Move away" or similar.

External alarms to have a supervisor level deactivation system when working in noise sensitive areas so these can be turned off, i.e. during night works or close proximity to housing. Portal notification or indication when external alarms are turned off.

#### 4.1.3. Visual Alarms when pedestrian detected – Inside the cab:

- Visual zonal alert that stays illuminated (Red for HFR Inner Zone or Amber for HFR Outer Zone) while person remains present within the zones.
- CCTV Display screen – optional.

## 4.2. Changing Zone Parameters

There may be times when the default detection zones may need to be altered in order to ensure the system remains effective. This should be identified during the risk assessment of the work activities. Where changes are required, it should be a simple and efficient task and be actioned either remotely or via a connected device.

## 4.3. Managing HFR False Alerts

HFR must always be active when the ignition is on, and the operator must continue to be notified visually of any pedestrians in the outer and inner zones even if the machine is in a "safe" state. Audible notifications must be minimised whilst machine is in a "safe" state. Video clips of detection must only be active when machine is in work mode i.e., Deadman lever engaged, or handbrake is released (for machine without Deadman levers).

## 4.4. Data & Recording

- HFR Outer Zone detection videos stored locally on hard drive of the equipment on the plant.
- HFR Inner Zone detection videos (10 sec Clip) are also stored locally on the hard drive of the equipment but can then be downloaded on request and will be stored in the online cloud-based portal. All numerical detection data is stored and visible through the online portal.

The on-board data storage should accommodate a minimum of 250hrs of video footage and be remote accessible (via API key) to ensure that it does not create a need for people to access the plant for data retrieval purposes.

## 5. Industry Standards

Although there are no British Standards that encompass everything that is required for these technologies, several standards do relate to them at least in part. Below is a list of standards that, as a minimum, the equipment should be manufactured to be compliant with:

- EC Reg 10 - Automotive Electromagnetic compatibility and / or ISO 13766 - Electromagnetic Compatibility for Earth-Moving Machinery
- ISO 13849 - Safety of machinery. Safety-related parts of control systems
- ISO 16001 - Earth-moving machinery. Earth-moving machinery - Object detection systems and visibility aids - Performance requirements and tests
- ISO 21815 - Collision warning and avoidance - Part 1: General requirements
- CE and or UKCA Certification

Additional consideration must be given to more general health and safety regulations, such as ensuring that the regular checks for Provision and Use of Work Equipment Regulations (PUWER) 1998 include inspection of any retro-fitted equipment.

Testing of HFR systems must be carried out by a competent person to validate the correct working of the equipment. This should be checked and confirmed as part of the initial reception checks for the plant when it arrives on a project and provision included within the regular inspection and maintenance checks for the plant.

## 6. Minimum Camera Specification

- 720p HD
- Colour
- 25 Frames per second
- Detection achievable in low level light (Min 0.1 Lux)
- IP68 protection
- 8-15v DC power range

- Operating temperature between -20 ~+60°C
- Relative humidity up to 90%
- Vertical and horizontal adjustable mountings
- Auto covered alarm

These specifications are intended to mirror those that have been defined by previous reports from contractors to ensure that they do not contradict wider industry standards.

## 7. Data Protection Requirements

Projects will need to ensure compliance with General Data Protection Regulations 2018 (GDPR) as HFR technology will capture personal data, e.g. in the form of video clips of persons. Controls will likely include limiting the personal data captured, granting access to only those who have a business need, identifying suitable secure storage for the data and being careful about what and how data is shared.

Individuals must also be informed about the use of HFR cameras, the purposes for which their personal data is being processed, and any potential risks associated with the processing.

Guidance and assistance on GDPR controls should be sought from the provider of the technology, and the existence of suitable controls should never be assumed. The relevant OU and EF [Data Protection Representatives](#) can be contacted if there is uncertainty around the route to compliance.

## 8. Training Requirements

Implementing HFR technology requires a combination of hardware and software components, as well as adequate training for the personnel who will be using it. The below training requirements should be considered and thought given to who will provide the training as well as who will need to receive the training.

### 8.1. Technical training

The personnel responsible for installing and maintaining the equipment and software should have a good understanding of the technical requirements of the system, including the hardware specifications, networking requirements, and software configuration. They should be trained on how to install the digital displays and cameras, how to configure the software, and how to troubleshoot common problems. Expertise on this will likely be supplied by the installer, but the project should consider on what basis this knowledge will be required on site, e.g. weekly, monthly, ad-hoc.

### 8.2. User training

The users of the system, such as plant operators and supervisors, will need to receive training on how to use the system effectively. This will include training on how to react when the system alerts the operator and, in the case of repeated encroachments, how to escalate the issue and use the data to improve safety and productivity. It is likely this will be available through the provider of the product, but the project must ensure all those who need it, receive the training and should ensure that there is provision for this.

### 8.3. Data analysis training

The system will generate a lot of data, and projects should have personnel who are trained in interpreting the information. They should be able to identify patterns in the data, make recommendations for improvements, and communicate their findings to other members of the team. This element will be key to changing behaviours and improving safety on site.

#### 8.4. Safety training

It is essential to recognise that personnel require adequate safety training specific to working safely around plant and heavy machinery. Use of HFR technology in no way removes or reduces the requirement for all those working around plant to have undergone Red Zone training, or similar.

#### 8.5. GDPR/Privacy training

HFR technology has the potential to collect sensitive information about individuals, so it is important to ensure that relevant personnel are trained on privacy policies and procedures. This should include how to handle and secure data, as well as how to handle any privacy breaches that may occur.

### 9. Dashboards & Reports

The following are dashboard and reporting requirements that should be incorporated within HFR systems for their full use and benefit to be realised. This may be provided via a dashboard in a web-based portal by the supplier or manufacturer of the equipment, or data provided through an API key may be used to produce dashboards and visualisations that are designed and produced by the project. In all cases, the below requirements should be considered.

#### 9.1. Remote transmission to cloud

All HFR systems to be installed ready to connect and transmit data to a cloud data portal wherever possible so that data can be retrieved near instantaneously and without contact with the plant/equipment.

#### 9.2. Real-time data

The dashboard should provide 'live' (or near-live) data on the detections made by the system. This should include the number of detections, the location of the detections, and the time of the detections.

#### 9.3. Customisable reporting

The dashboard should allow for customisable reporting so that users can generate reports specific to their needs. Reports should be able to be generated based on specific time frames, locations, or types of detections. It should allow interrogation of historic data so that trends can be identified.

#### 9.4. Visual representations

The dashboard should use visual representations such as graphs, charts, and plans of the site to help users understand the data. For example, a heat map could be used to show areas with high levels of detections.

#### 9.5. Alerts

The dashboard should provide alerts in the event of any issues or anomalies with the HFR equipment. This could include alerts for component failures, camera obstructions, or any other issues that could constitute a safety issue or impact the accuracy of the system.

**9.6. User management**

Access to the data should be controlled and restricted to authorised users but should be manageable local to the project for ease and accuracy, e.g. in the case of staff leaving or moving projects.

**9.7. Integration with other systems**

It may be useful to have facility for automatically linking the data into other software and reporting systems. Overlaying trends in HFR systems with, for example, incident/accident reporting trends may reveal insights that impact on decision making in these areas.

## Appendix 1 – Decision making process

