

# Mixed-media CDM Tool to help new graduates spot hazards



**Prof Billy Hare; Prof Iain Cameron; Dr Kenneth Lawani**

# IOSH Funded Project:

## Helping designers identify hazards in their designs

Funded by



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Innovation | Technology | Sustainability



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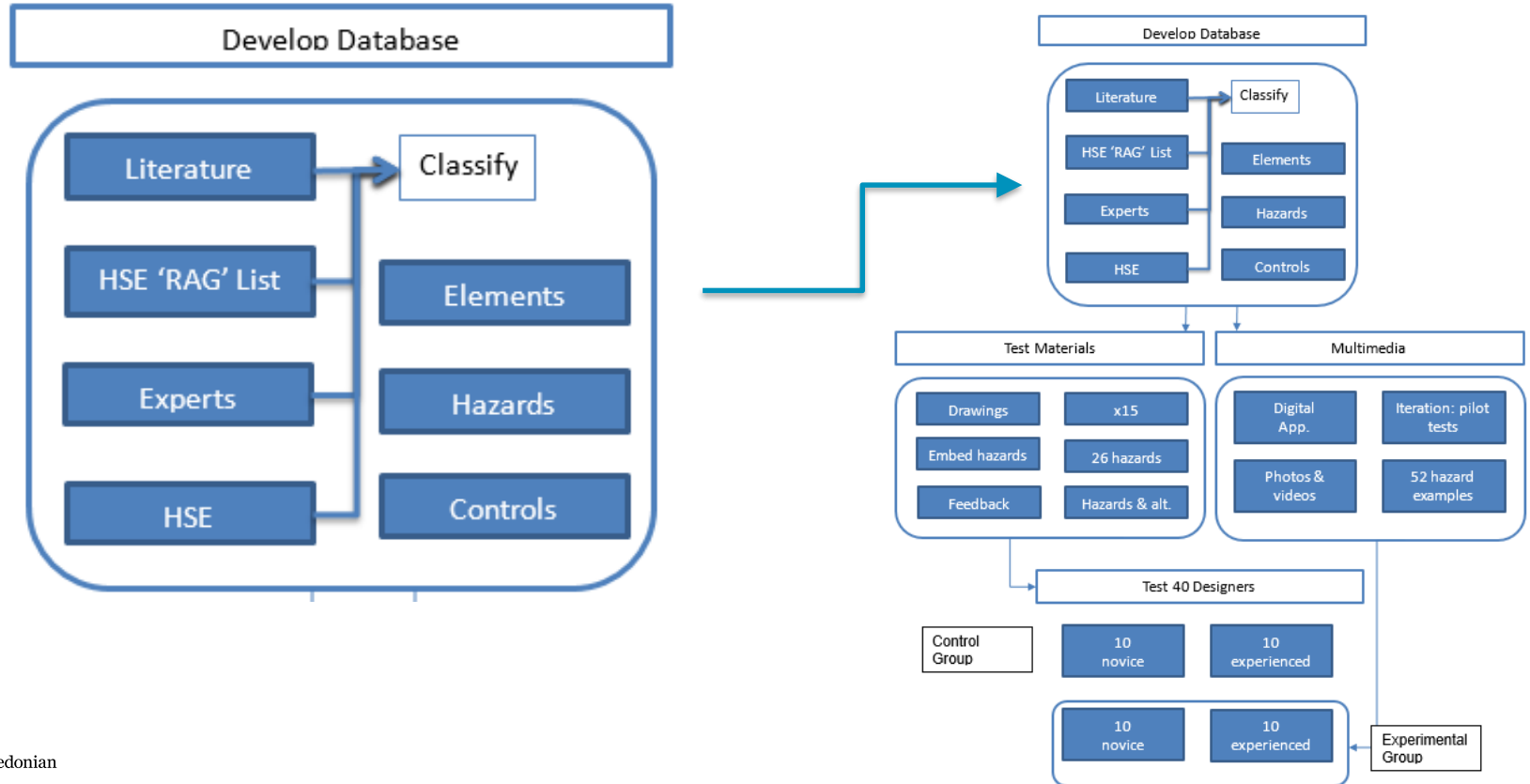
## Aim

“improve how designers involved in construction projects learn about how their design influences the management of occupational safety and health (OSH) once the design is implemented”

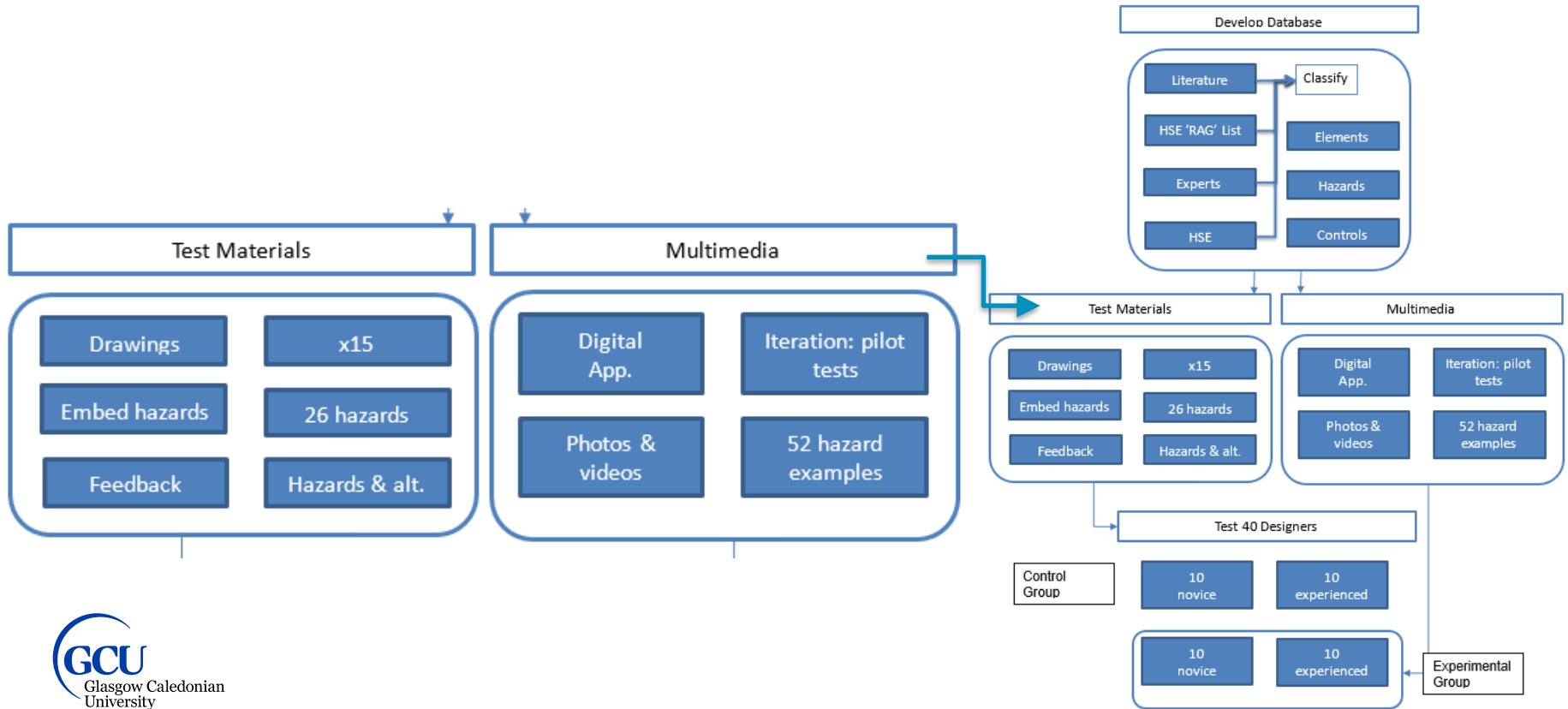
Funded by



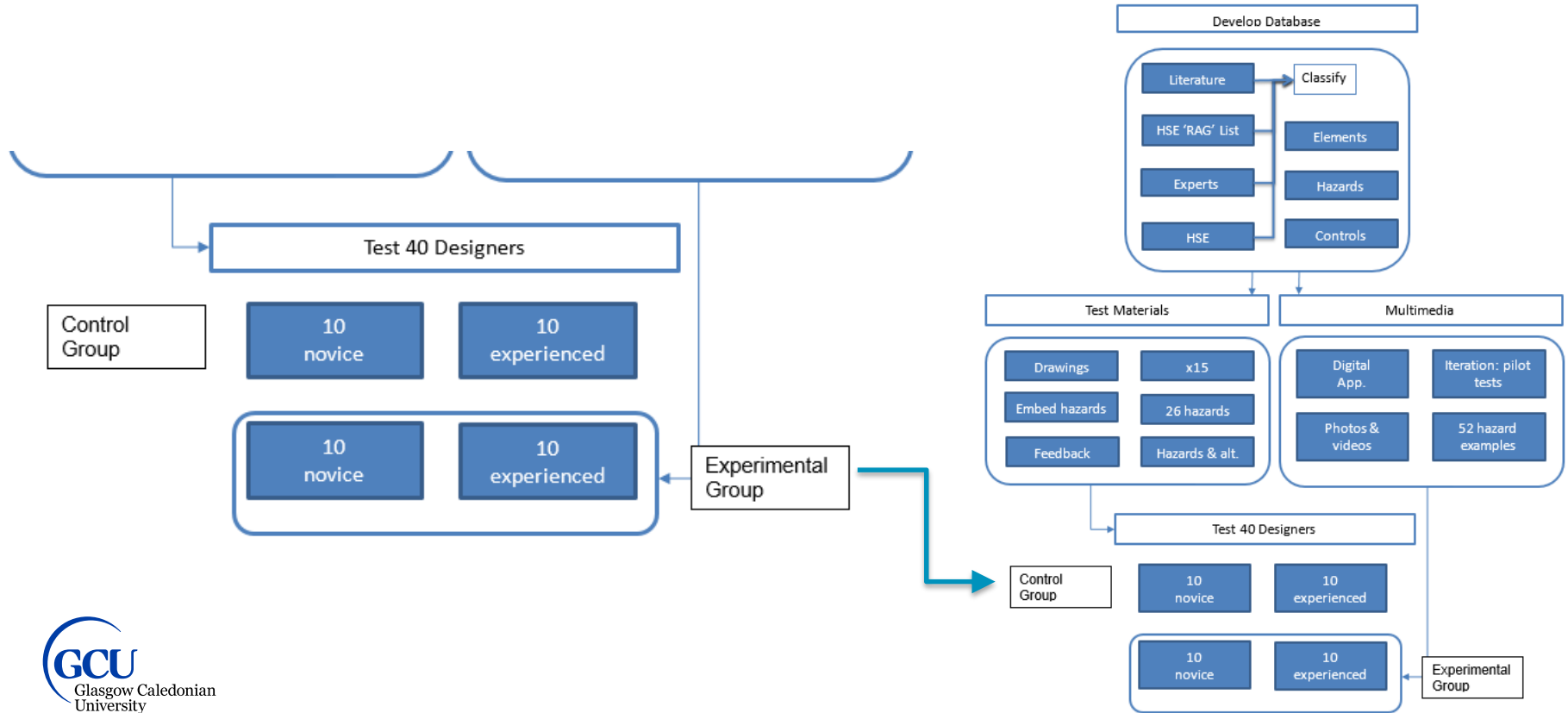
# IOSH Funded Project: Helping designers identify hazards in their designs



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# Sample Breakdown

		Expert	Novice	Total
<b>Experimental Groups</b>	Architect	5	5	10
	Civil Eng.	5	5	10
<b>Control Groups</b>	Architect	5	5	10
	Civil Eng.	5	5	10
		20	20	40

# Measurement criteria

Type	Measure
Hazards identified	No.
Controls proposed	No.
'ERIC' Level	Score

Type of Control	Score
Eliminate (through design)	5
Reduce (through design)	4
Reduce	3
Inform of procedure (SSOW)	2
Control (contractor PPE)	1

Ignored: generic; standard  
Building Control (Code)  
items; out of scope

Notes:

Project Name:

**Architectural Design  
Hazard Identification**

Title:

Ground Floor (Level 0)

Project Number:

**IOSH\_180518\_01**

Date:

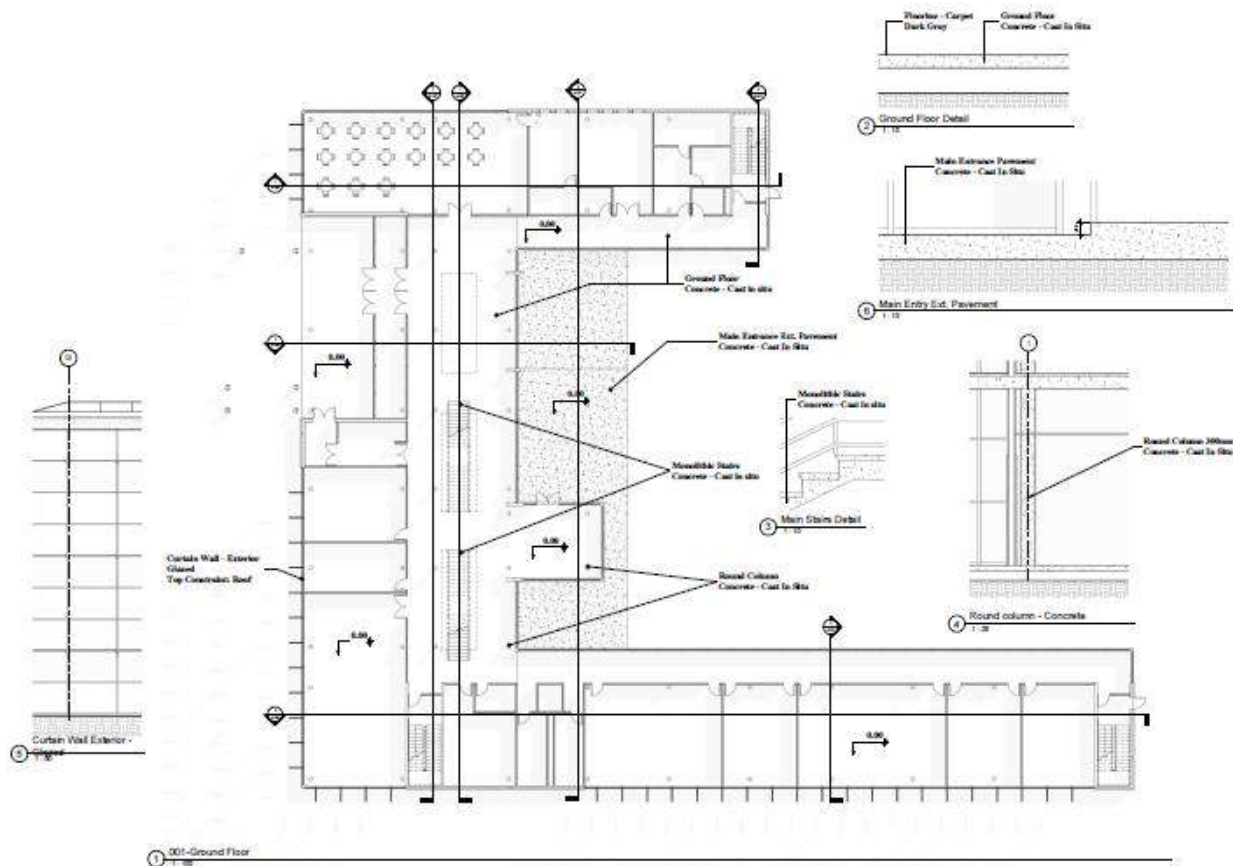
18/05/2018

Drawing Number:

**A101**

Scale:

As indicated



# Hazards in Drawings are based on HSE RAG Lists

## **RED**

**Avoid unless there is no alternative. Must be justified and additional risk mitigation must be included in the design.**

## **AMBER**

**Use sparingly and carefully. Provide advice and guidance if these elements need to be incorporated.**

## **GREEN**

**Preferred solutions.**



INADEQUATE TRAFFIC ROUTE



LACK OF CONSTRUCTION STAGE FIRE  
CONTAINMENT



LIFTING HEAVY BLOCKS



LIFTING HEAVY CLADDING



LIFTING HEAVY LINTELS



LIP DETAIL TRIP HAZARD



# PAS 1192-6

## Specification for collaborative sharing and use of structured Health and Safety information using BIM

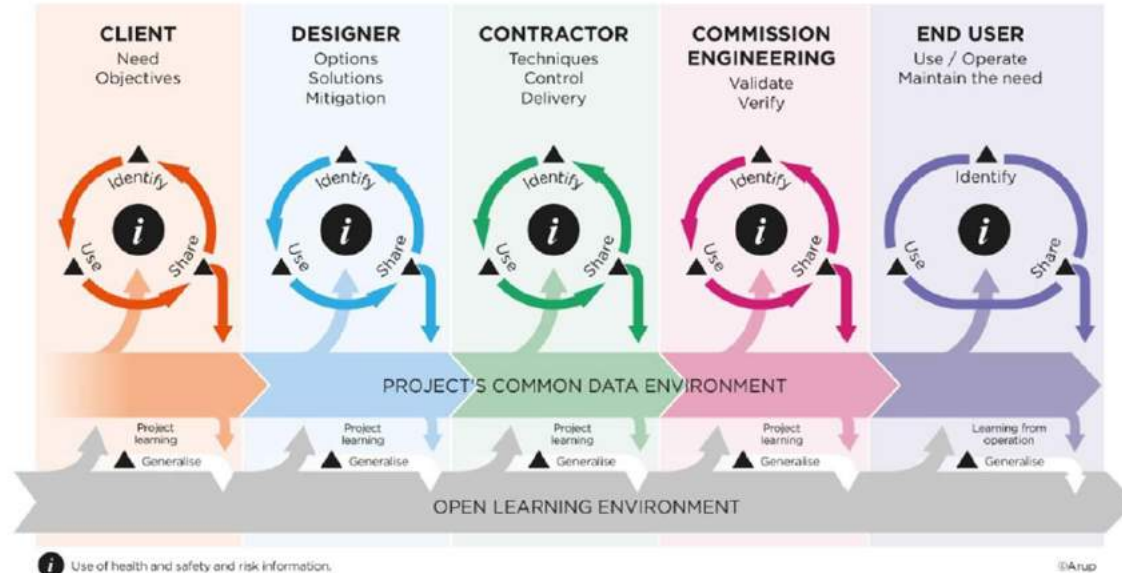
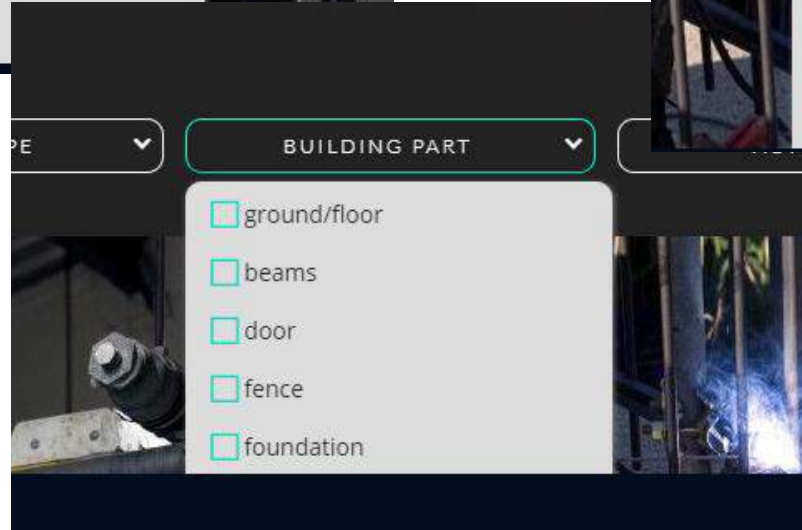
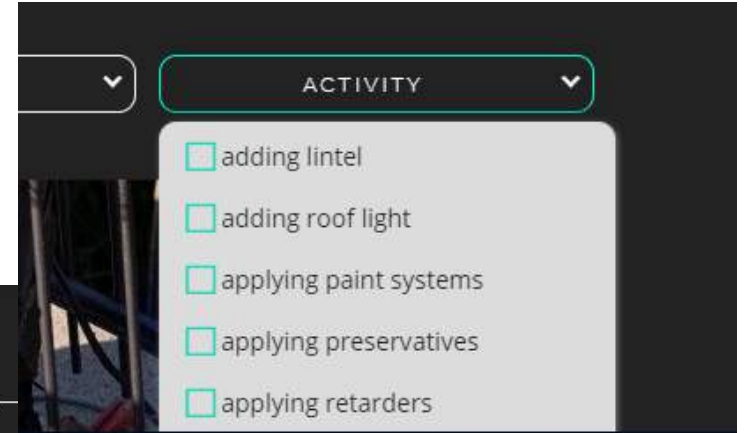
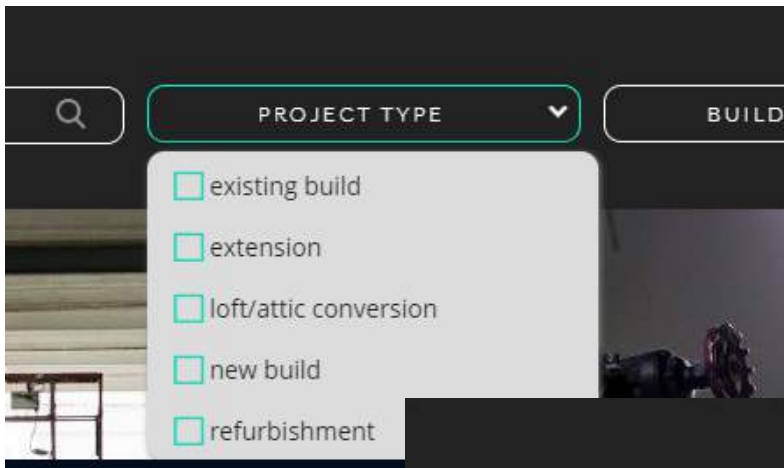


Figure 2 – Progressive development of H&S Information





**USING A POWERED TOOL  
PLASTERBOARD**

REDUCE

ELIMINATE



**GYPSUM BOARD**

An alternative to prevent workers from using a powered tool to cut plasterboard is to use prefabricated walls with gypsum board already attached, which eliminates the need to cut on site

**FURTHER READING**

REDUCE

ELIMINATE



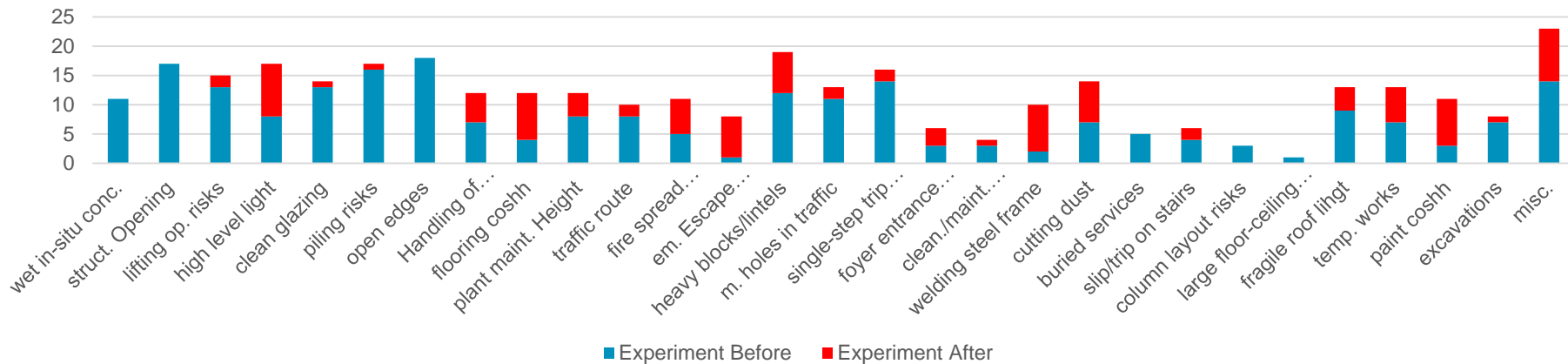
**900MM WIDE BOARDS**

An alternative solution to prevent workers from using a powered tool to cut plasterboard is to use 900mm wide boards, which leads to less cutting and increased productivity

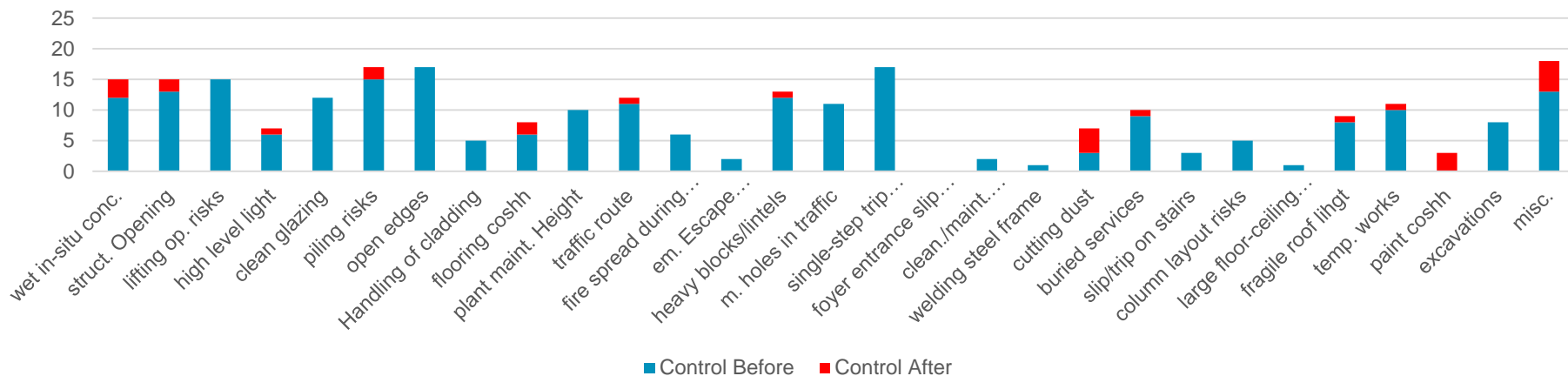
**FURTHER READING**

<http://www.hse.gov.uk/research/rrnd/rr812.pdf> (page 11)

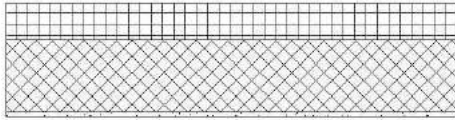
## Experimental Group Before/After Cumulative



## Control Group Before/After Cumulative



## Blocks over 20kg



Exterior Wall - Insulation on Masonry

Construction:

- Insulation/Thermal Barriers (over 20kg)
- Air Infiltration Barrier
- Masonry - Concrete Block (36kg)
- Vapour/Moisture Barriers
- Plasterboard

“Always order blocks that weigh less than 20 kg unless specified by a designer for genuine technical reasons.”

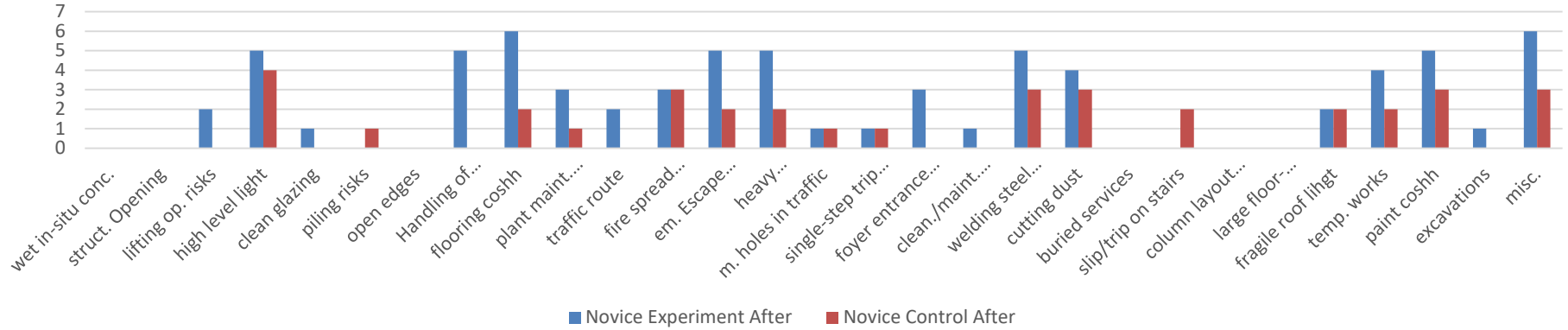


Always select the lightest block you can that has the required strength.

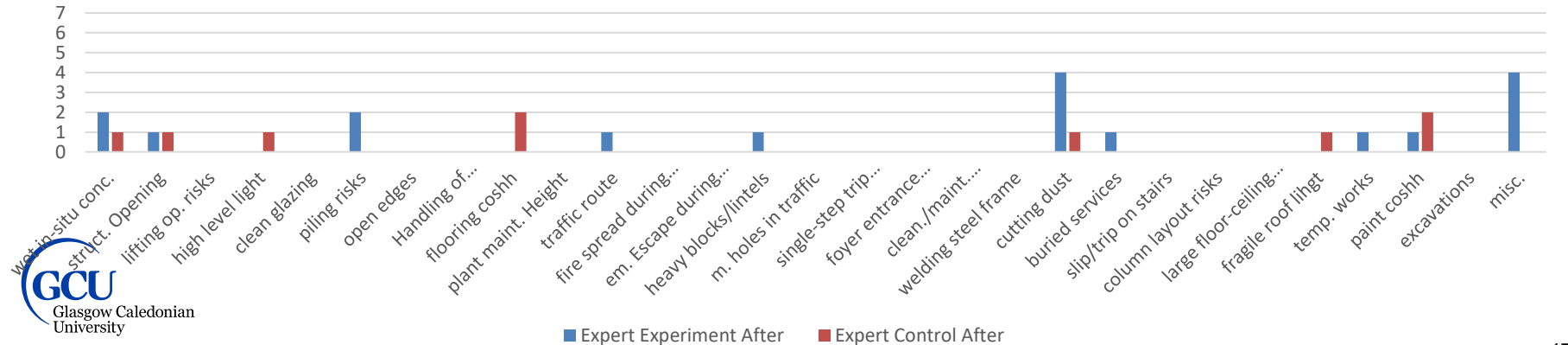
If using large foundation (trench) blocks, consider units with handholds to help grip.



## Novice After Experiment/Control



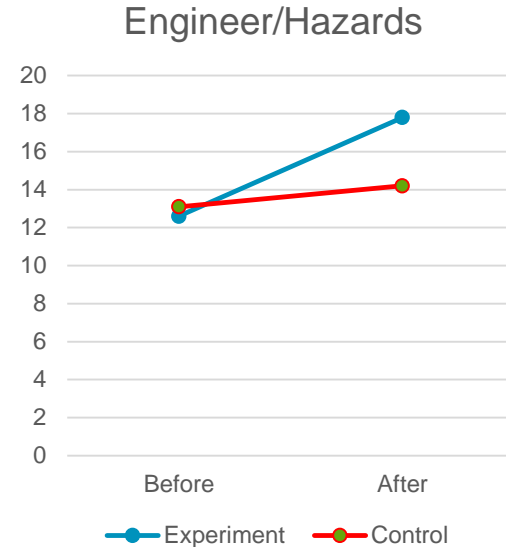
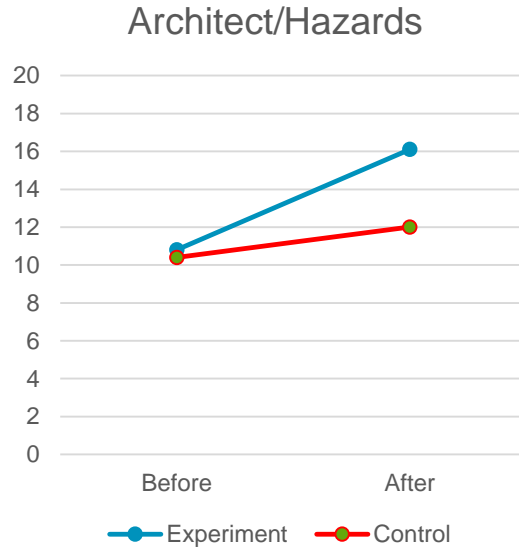
## Expert After Experiment/Control



# Average No. Hazards identified

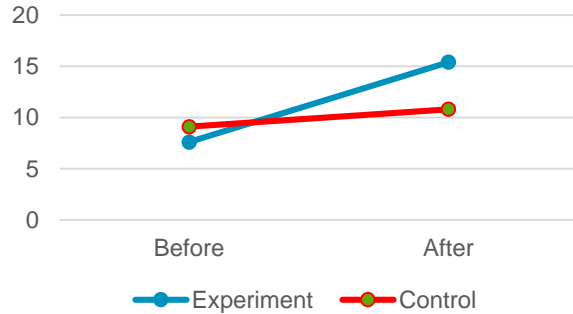


# Average No. Hazards identified

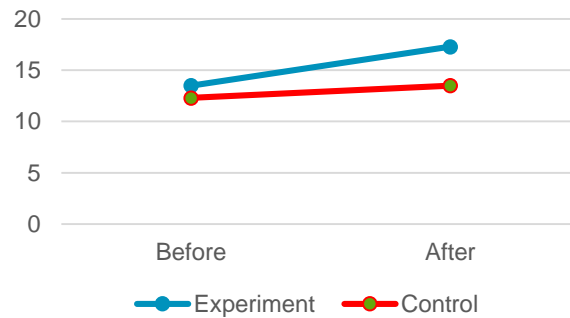


# Average No. of Controls

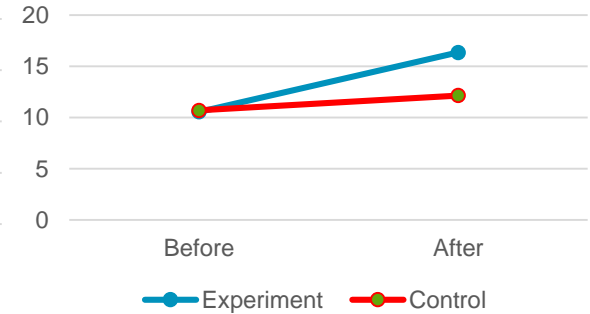
Novice/Controls-N



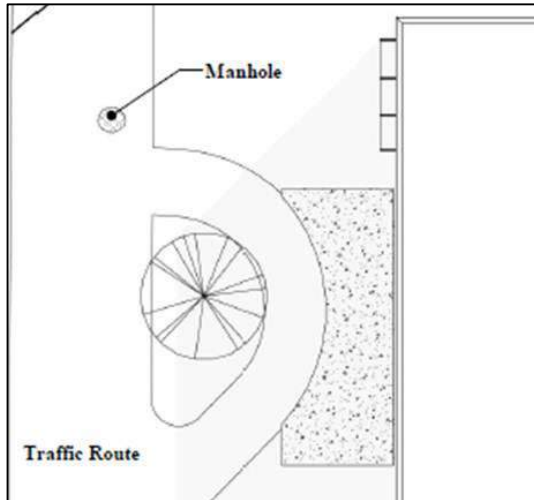
Expert/Controls-N



All/Controls-N



Man Hole sited  
in traffic route

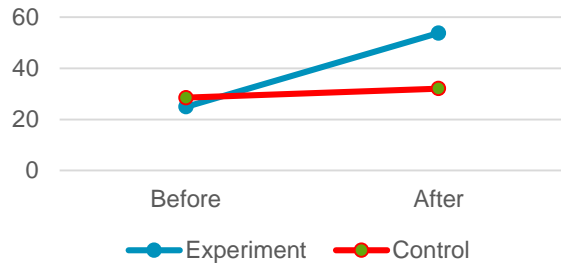


Sited away from traffic route



# Average 'ERIC' Score

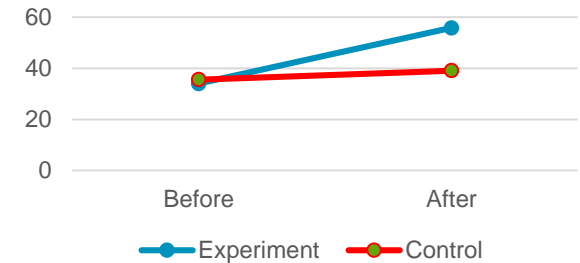
Novice/Controls-Score



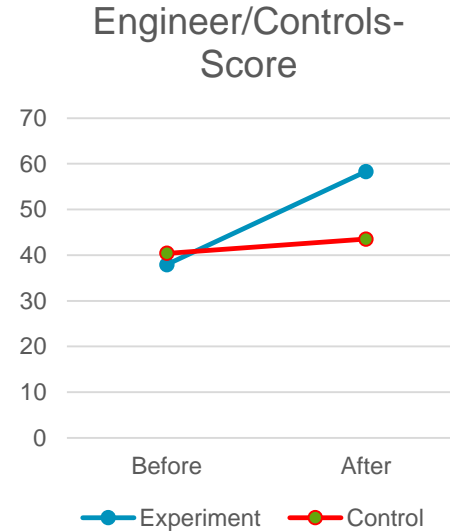
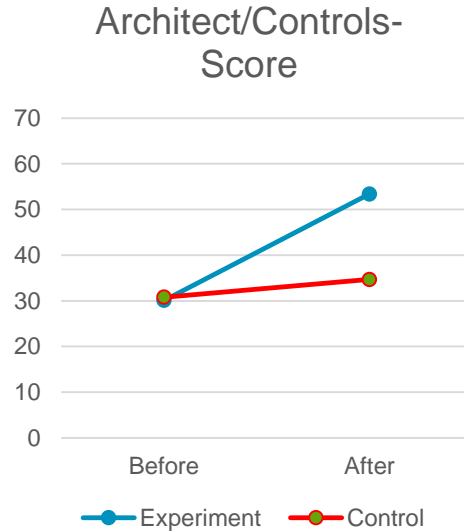
Expert/Controls-Score



All/Controls-Score



# Average 'ERIC' Score



# Conclusions

1. Those using digital tool improved better than control group
  2. Digital tool helped novice users the most
  3. Helped novice architects best
  4. Engineers performed better than architects
  5. Average (mean) scores for 'experimental' novice group improved beyond 'control' expert group
- But there's no substitute for site experience...

# Future

IOSH publication of report: <https://www.iosh.com/designershazards>

Digital Tool: <http://software.nirilia.co/contracting/GCU-IOSH/>

Permission from IOSH to develop tool further with other partners

Can link with BIM software

Test Drawings: Excellent CDM Training Tools

# Thank you

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