

# EXAMPLES AND PRACTICE



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## WORKED EXAMPLES

Page 1 – describes house or apartment and details of deficiencies relevant to the hazard.

Page 2 – shows stages in scoring with justification and re-scoring on the basis of suggested fixes to the hazards.



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# TERMS – ENGLISH TO AMERICAN

Worked examples have not been converted yet from English terms – see glossary below:

- HHSRS Version 2 = HHSRS
- Maisonette = apartment, usually on 2 floors, may have own entrance
- Boxroom = storage room
- Storey = story
- Gallery access = access to the unit by a porch
- 80 degrees C = 176 degrees Fahrenheit
- s/c Flats (self-contained flat) = apartment with its own kitchen/bathroom



## Page 1

### HOT SURFACES ETC

**Vulnerable age**  
Persons aged under 5 years  
Related hazards  
Fire risk, Excessive heat

**Multiple locations**  
Secondary hazards  
Yes  
Yes

**Yes**  
No  
No

**HHSRS VERSION 2**

**Maisonette**

**Block elevation**

A) Uninsulated central heating pipes

A) (a) p. of foot of bed

Maisonette

Block elevation

A) Plan of maisonette

**DESCRIPTION OF HAZARD/S**

Dwelling: 1930's 3 bedroomed maisonette

A) Heating pipes: The photographs show the uninsulated central heating pipes in the third bedroom of a 3 bedroomed maisonette on the top two floors of a six storey gallery access, walk-up block. The uninsulated pipes from the district heating system are exposed adjacent to the radiators in most of the rooms in the flat, despite the temperature of the pipes being in excess of 80 degrees C. High temperatures are required by the long distribution runs from the estate's boiler house and the tenants have no control on the output of the system, other than the manual valves on each individual radiator. In the third bedroom, the only position for the bed means that there is a gap between the foot of the bed and the exposed pipes.

**LIST OF RELEVANT MATTERS**

LIKELIHOOD	A	OUTCOMES	A
a	Unprotected hot surfaces	a	Surface/liquid temperature
b	Unguarded open flames	b	Exposure
c	Hot water to bath		
d	Hot water to sink		
e	Thermostatic taps	# Secondary hazards	A
f	Kitchen layout	None	-
g	Inadequate separation		
h	Disrepair		
i	Inadequate space		

**Key**

3	Seriously defective
2	Defective
1	Not satisfactory
-	Satisfactory

## Page 2

### HEALTH AND SAFETY RATING SYSTEM SCORES

**LIKELIHOOD** Low → High

Average: 306

Example: 18

**Justification** The central heating pipes are both exposed and at a readily accessible height in most of the rooms in the maisonette and particularly in the smaller bedrooms, most likely to be occupied by small children. This and the high temperature at which this district heating system is run and lack of individual control, means that the risk of an accident is substantially higher than in an average dwelling with its own water-borne central heating system.

1920-45 s/c Flats

1 in 18

**OUTCOMES**

Average: 0.2

Example: 0.2

**Class I** 0.2

**Class II** 2.2

**Class III** 21.5

**Class IV** 76.1

**Justification** As a small child could easily become trapped between the pipes and the bed in the third bedroom, the probability of severe harm is increased.

**RATING**

Average: 23

Example: D

**Score: 633**

**RATING SCORES AFTER IMPROVEMENT**

**IMPROVE** Likelihood to 1 in 320 Outcomes to 0.2 | 0.0 | 21.5 | 76.3 %

**Justification** Insulating and covering the pipes would reduce the likelihood of a major accident to near the average for the stock.

**NEW RATING**

Improved: H

**Score: 28**

*Av: Nos* Average likelihood, outcomes and HHSRS score for hazards from hot surfaces and materials by persons aged under 5 years in 1920-45 flats, 1997-99.



# WORKED EXAMPLE MAIN HEADING

## HOT SURFACES ETC

HHSRS VERSION 2

Vulnerable age	Persons aged under 5 years	Multiple locations	Yes	No
Related hazards	Fire risk, Excessive heat	Secondary hazards	Yes	No



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# WORKED EXAMPLE DESCRIPTION

A) Uninsulated central heating pipes



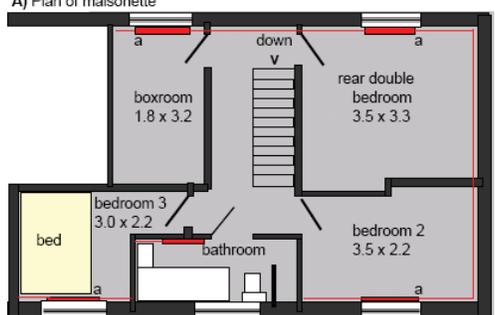
A) Gap at foot of bed



Maisonette



A) Plan of maisonette



Block elevation



**DESCRIPTION OF HAZARD/S** Dwelling: 1930's 3 bedroomed maisonette

A) Heating pipes: The photographs show the uninsulated central heating pipes in the third bedroom of a 3 bedroomed maisonette on the top two floors of a six storey gallery access, walk-up block. The uninsulated pipes from the district heating system are exposed adjacent to the radiators in most of the rooms in the flat, despite the temperature of the pipes being in excess of 80 degrees C. High temperatures are required by the long distribution runs from the estate's boiler house and the tenants have no control on the output of the system, other than the manual valves on each individual radiator. In the third bedroom, the only position for the bed means that there is a gap between the foot of the bed and the exposed pipes.



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# WORKED EXAMPLE RELEVANT MATTERS

## LIST OF RELEVANT MATTERS

LIKELIHOOD		A	OUTCOMES		A
a	Unprotected hot surfaces	3	a	Surface/liquid temperature	3
b	Unguarded open flames	-	b	Exposure	3
c	Hot water to bath	-			
d	Hot water to sink	-	# Secondary hazards		A
e	Thermostatic taps	-	None		-
f	Kitchen layout	-			
g	Inadequate separation	-			
h	Disrepair	-	Key	3	Seriously defective
i	Inadequate space	3		2	Defective
				1	Not satisfactory
				-	Satisfactory



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# WORKED EXAMPLE LIKELIHOOD

## HEALTH AND SAFETY RATING SYSTEM SCORES

1920-45 s/c Flats

LIKELIHOOD Low → High

1 in 18



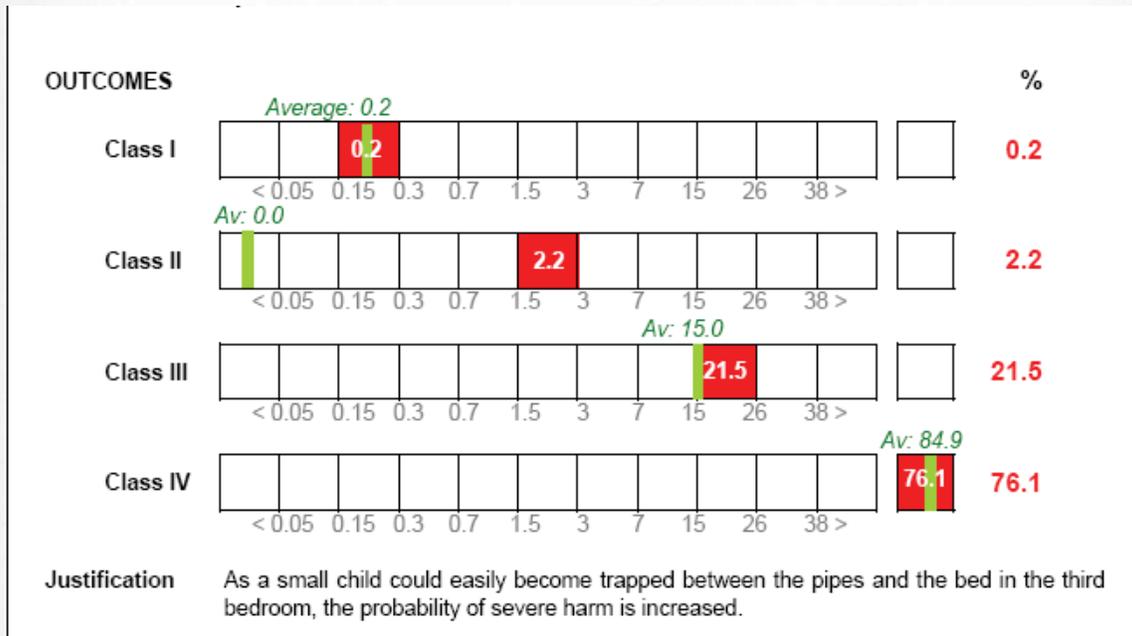
### Justification

The central heating pipes are both exposed and at a readily accessible height in most of the rooms in the maisonette and particularly in the smaller bedrooms, most likely to be occupied by small children. This and the high temperature at which this district heating system is run and lack of individual control, means that the risk of an accident is substantially higher than in an average dwelling with its own water-borne central heating system.



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# WORKED EXAMPLE OUTCOMES



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# WORKED EXAMPLE HAZARD SCORE AND BAND



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# WORKED EXAMPLE AFTER IMPROVEMENT

## RATING SCORES AFTER IMPROVEMENT

IMPROVE Likelihood to **1 in 320** Outcomes to **0.2 | 0.0 | 21.5 | 78.3 %**

Justification Insulating and covering the pipes would reduce the likelihood of a major accident to near the average for the stock.



*Av: Nos* Average likelihood, outcomes and HHSRS score for hazards from hot surfaces and materials by persons aged under 5 years in 1920-45 flats, 1997-99.



# WORKED EXAMPLE: DAMP & MOLD

### DAMP AND MOULD GROWTH HHSRS VERSION 2

Vulnerability Related hazards	Persons aged under 15 years Excessive Cold	Multiple locations Secondary hazards	Yes No	No No
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**A) Living room**

**B) Kitchen**

**C) Second bedroom**

**Heat elevation**

**F front elevation**

**DESCRIPTION OF HAZARDS** Dwelling: 1960's end terrace, 2 bedroom house

**Background:** This is a two-story, two-bedroom end of terrace house built in the late 1960's from traditional construction on an exposed rubble design prior to Building Regulations.

**A) Living room:** Rising and severe penetrating damp with associated mould growth is affecting the external gable wall in both recesses to either side of the fireplace in the living room.

**B) Kitchen:** Dampness caused mainly by condensation is affecting the whole of the front external wall surrounding the window and adjacent ceiling and partly wall in the small kitchen.

**C) Second bedroom:** Penetrating damp and some associated mould is affecting the end wall. There is hair line cracking to the external render generally.

**LIST OF RELEVANT MATTERS**

LIKELIHOOD & OUTCOMES	A	B	C	F	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	
1 Heavy damp	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 Penetrating damp	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 Condensation	2	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Mould growth	2	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
a Energy efficiency	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b Background ventilation	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
c Extract ventilation	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
d Clothes drying facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
e Damp proofing	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
f Damp air (walls etc)	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
g Exposed water tanks etc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
h Water using appliances	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

### HEALTH AND SAFETY RATING SYSTEM SCORES 1960-79 House

**LIKELIHOOD** Low → High **1 in 2**

Average: 446

Example: **2**

**Justification:** The presence of dampness in two of the main rooms on the ground floor and in the second bedroom increases the risk of a major illness being caused or exacerbated by the conditions, significantly above that for the average damp dwelling.

**OUTCOMES**

Average: 0.0

Class I: **0.0** | 0.0 | 0.1 | 0.3 | 0.7 | 1.5 | 3 | 7 | 15 | 26 | 38 | % **0.0**

Class II: **0.0** | 0.1 | 0.3 | 0.7 | 1.5 | 3 | 7 | 15 | 26 | 38 | % **1.0**

Class III: **0.0** | 0.1 | 0.3 | 0.7 | 1.5 | 3 | 7 | 15 | 26 | 38 | % **21.5**

Class IV: **0.0** | 0.1 | 0.3 | 0.7 | 1.5 | 3 | 7 | 15 | 26 | 38 | % **77.5**

**Justification:** As well as damp, an occupant's exposure to mould growth, and associated spores, in two of the ground floor rooms and in one of the bedrooms, will increase the risk of more serious outcomes occurring.

**RATING** **A B C D E F G H I J** Score: **4112**

**RATING SCORES AFTER IMPROVEMENT**

IMPROVE: Likelihood to **1 in 320** Outcomes to **0 | 0 | 21.5 | 78.3 %**

**Justification:** Repairing the damp, re-rendering the external walls and providing mechanical ventilation in the kitchen would reduce the risk to average levels – a score of 15, and if improving the thermal efficiency of the walls would reduce the hazard further.

**NEW RATING** **A B C D E F G H I J** Score: **15**

*Av: Nos* Average likelihood, outcomes and HHSRS score for hazards from damp & mould by persons aged under 15 years in 1960-79 non-1 bedroom dwellings, 1997-99.



# WORKED EXAMPLE: COLD

**EXCESS COLD** HHSRS VERSION 2

Vulnerable group: Persons aged 60 years or over  
 Related hazards: Damp and Mould Growth

Multiple locations: Yes  
 Secondary hazards: Yes

**DESCRIPTION OF HAZARDS**

**Location:** 1960s non listed semi detached house, similar to the DEF design.

**Background:** The walls are of tiled frame construction, faced externally with vertical slat sheathing. Internally the walls are finished with plasterboard supported on timber frames.

**A) Heating:** This was originally by open fires throughout. At some time, the open fireplaces in the first floor were sealed and gas fires fitted to the two ground floor living rooms. The occupier uses portable electric heaters to supplement the gas fires.

**B) Insulation:** The original construction included glass wool galling hung within the external wall frame, and a thin (50mm) layer to the whole of the roof space. There is no insulation to the hot water tank and the windows are single glazed.

**LIST OF RELEVANT MATTERS**

	A	B	# Secondary hazards	A	B
a) Thermal insulation	-	3	- None	-	-
b) Dampness	-	3	-	-	-
c) Sealing of roofline	-	3	-	-	-
d) Type of heating provision	2	-	-	-	-
e) Size of heating system	3	-	-	-	-
f) Installation & maintenance	3	-	-	-	-
g) Controls to heating system	3	-	-	-	-
h) Amount of ventilation	-	-	Key	3 Satisfactory/Good	-
i) Ventilation controls	-	-	2	Defective	-
j) Escape to ventilation	-	-	1	Not satisfactory	-
k) Draught/leakage ventilation	-	-	-	Satisfactory/NA	-

**HEALTH AND SAFETY RATING SYSTEM SCORES** 1945-79 House

**LIKELIHOOD** Low → High **1 in 32**

Average: 400 Example

4000 3600 3200 2800 2400 2000 1600 1200 800 400 0

**Justification:** The two gas fires are not capable of heating the whole of the dwelling. The insulation, even as original, would be considered inadequate now, and has rotted over the years to become less effective. The result is that the likelihood of the dwelling being

**OUTCOMES** %

Average: 340

Class I 31.6  
 Class II 4.6  
 Class III 21.5  
 Class IV 42.3

**Justification:** Although the likelihood of a harmful occurrence is much higher than average, there is nothing to indicate that spread of harm will vary from the average.

Example Average: 600

**RATING** A B C D E F G H I J Score 10233

**RATING SCORES AFTER IMPROVEMENT**

IMPROVE Likelihood to 1 in 1,000 Outcomes to 310 | 46 | 215 | 423 %

**Justification:** Installing an efficient heating system capable of heating the whole of the dwelling and providing additional thermal insulation to the external walls and the roof space would reduce the rating around the average for dwellings of this age group (Band D).

**NEW RATING** A B C D E F G H I J Score 327

Av. Nbs: Average likelihood, outcomes and HHSRS score for excessive cold for persons aged 60 years or more in 1964-1979 Non-FIMCs and all dwellings, 1997-99.

## EXERCISES

- On the basis of the information provided
  - consider the likelihoods and the outcomes for the hazard described
  - note down your justification for both the likelihood and the outcomes
- After the exercise, we will discuss the justifications and the results



# Damp and mold



Front elevation



Rear bedroom ceiling



Rear elevation



Half bathroom

## DESCRIPTION OF HAZARD

This is a two story, row house, built around 1890. There are two bedrooms and a bathroom on the upper floor, and a half bathroom in the rear addition on the lower floor.

There is damp, water stained ceiling plaster in the rear bedroom caused by a leaking roof around the chimney stack. There is damp, water-stained wall plaster in the half bathroom and also some mold growth.



# Falling on level surfaces

Dwelling: Pre-1919 row house.



Front elevation



Rear door & yard



Front door



Kitchen and hallway



## DESCRIPTION OF HAZARD

There are several steps at the front door to the new door and frame. There is step up into the main hall after entering the front door. From the lower floor rear room there is a step down into the kitchen. From the kitchen there is a step down into the rear hallway, and then a step up into the bathroom. There is a step down into the rear yard at the rear door. Concrete in the rear yard is broken and uneven.



# DISCUSSION OF JUSTIFICATIONS AND RESULTS

