Title	**Demonstrate knowledge of elements of construction and loads in fixed and mobile property fires**		
Level	**4**	**Credits**	**8**

Purpose	People credited with this unit standard are able to demonstrate knowledge of: building construction and services in relation to fire; ship construction, cargoes and services in relation to fire; and vehicle construction, cargoes and services in relation to fire.

Classification	Fire and Rescue Services > Fire and Rescue Services - Structural and Industrial

Available grade	Achieved

Prerequisites	Unit 4651, *Apply knowledge of structural fire behaviour*, or demonstrate equivalent knowledge and skills.

Guidance Information

1 Compliance with the fire and rescue service provider's Health and Safety policy and procedures is mandatory.

2 The primary reference for this unit standard is: Buchanan, A.H. (ed), *Fire Engineering Design Guide* (Christchurch: Centre for Advanced Engineering, 2001).

3 Definition
Fire and rescue service provider's requirements refer to policies and procedures on safety and operation set down by each fire and rescue service employer or host organisation.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of building construction and services in relation to fire.

Performance criteria

1.1 Construction types are identified and their effect on fire behaviour is described in accordance with the primary reference.

Range a minimum of three of – residential, commercial, industrial, multi-storey.

1.2 Methods of controlling and utilising building services to support incident management strategies are described in accordance with the primary reference and fire and rescue service provider's requirements.

Range a minimum of three of – heating, ventilation, air conditioning, electrical system, gas systems, lifts.

1.3 Methods of controlling and utilising fixed fire detection and protection systems to support fire fighting are described in accordance with the primary reference and fire and rescue service provider's requirements.

Range a minimum of four of – smoke detectors, heat detectors, sprinkler systems, risers, gas flooding, automatically controlled reaction devices, air sampling systems, communication systems.

1.4 Common fire engineering design features are described in accordance with the primary reference and fire and rescue service provider's requirements.

Range a minimum of three of – protected paths, open paths, safe paths, fire cells, fire compartments.

Outcome 2

Demonstrate knowledge of ship construction, cargoes and services in relation to fire.

Performance criteria

2.1 The effect of bulk cargoes on fire behaviour is described in accordance with the primary reference and fire and rescue service provider's requirements.

Range a minimum of three of – grain, sulphur, coal, cement, chemicals, petroleum products.

2.2 The fire behaviour of vessel types and their construction features are described in accordance with the primary reference.

Range a minimum of three of – tankers, cargo and container vessels, passenger vessels, roll-on-roll-off vessels, fishing vessels, military vessels.

2.3 Methods of controlling ship's services for fire fighting are described in accordance with the primary reference and fire and rescue service provider's requirements.

Range a minimum of three of – heating, ventilation, air conditioning, electrical system, lifts.

2.4 Fixed fire detection and protection systems are identified and methods of controlling them for fire fighting are described in accordance with the primary reference and fire and rescue service provider's requirements.

Range a minimum of four of – smoke detectors, heat detectors, sprinkler systems, risers, gas flooding, automatically controlled reaction devices, communication systems, air sampling systems.

2.5 Impact of fire fighting operations on ship stability is described in accordance with the primary references.

Range metacentric height, free surface water, fire fighting water.

Outcome 3

Demonstrate knowledge of vehicle construction, cargoes and services in relation to fire.

Performance criteria

3.1 The effect of bulk cargoes on fire behaviour is described in accordance with the primary reference.

Range a minimum of four of – grain, sulphur, coal, chemicals, livestock, petroleum products, passenger.

3.2 Construction features of vehicle types are described in terms of their effect on fire behaviour in accordance with the primary reference.

Range truck, truck and trailer, bus, railway rolling stock.

3.3 Vehicle's fuel type is identified, and its effect on fire behaviour is described in accordance with the primary reference.

Range petrol, diesel, liquefied petroleum gas, compressed natural gas.

3.4 Procedures for isolating vehicle electrical systems are described in accordance with the primary references and fire and rescue service provider's requirements.

3.5 Special hazards associated with vehicles are described in accordance with the primary references.

Range a minimum of four of – auxiliary power units, air and brake lines, air conditioning, biohazards, electrical systems, chemical hazards.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	16 March 1995	31 December 2025

Process	Version	Date	Last Date for Assessment
Revision	2	21 May 1998	31 December 2025
Review	3	25 March 2004	31 December 2025
Review	4	20 November 2009	31 December 2025
Review	5	30 September 2021	31 December 2025

Consent and Moderation Requirements (CMR) reference	0039

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.