FIRE AND RESCUE SERVICES - STRUCTURAL AND INDUSTRIAL
Explain principles of structural fire

level: **5**

credit: **5**

final date for comment: March 2008

expiry date: December 2009

sub-field: Fire and Rescue Services

purpose: This unit standard is for people who need to develop an understanding of the behaviour of fire in building structures, for the purposes of fire and rescue services, planning or investigation.

People credited with this unit standard are able to: explain fundamentals of the process of fire development; explain fundamentals of fire severity in building compartment fires: explain fundamentals of fire behaviour tests; and explain fundamentals of fire growth models.

entry information: Recommended: Unit 4651, *Apply knowledge of structural fire behaviour,* or demonstrate equivalent knowledge and skills.

accreditation option: Evaluation of documentation and visit by NZQA and industry.

moderation option: A national moderation system of moderation networks has been established by the Fire and Rescue Services Industry Training Organisation.

special notes:

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

2 Assessment against this unit standard may take place under real or practical simulated conditions.

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3 The primary references for this unit standard are the *Manual of Firemanship Book* and *Building Construction and Structural Fire Protection*, London, HMSO, 1992; *Handbook for Fire Engineers*, Leicester, Institute of Fire Engineers, 1989; Lie, TT. *Fire in Buildings*, London, Applied Science Publishers, 1972, and Buchanan, AH (Ed) *Fire Engineering Design Guide*. Christchurch, University of Canterbury, 1994, *Essential Readings from HM Fire Inspectorate*. These references are held at the NZFS Information Centre.

Elements and Performance Criteria

element 1

Explain fundamentals of the process of fire development.

performance criteria

1.1 Fire growth periods are identified in terms of variance in materials, construction, and protection systems in accordance with the primary references.

1.2 Burning and decay periods are assessed in terms of time in accordance with the primary references.

1.3 The rate of burning is explained in terms of the method of calculation in accordance with the primary references.

1.4 The importance of rate of burning is explained in terms of fire development in accordance with the primary references.

1.5 The progress of temperature change within fire is explained in accordance with the primary references.

1.6 The concepts of flashover and back draught are explained in terms of their differences in accordance with the primary references.

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element 2

Explain fundamentals of fire severity in building compartment fires.

performance criteria

2.1 Fire severity is explained in terms of the concept in accordance with the primary references.

Range: fuel load and configuration.

2.2 Fuel-controlled and ventilation-controlled fires are described in terms of their differences in accordance with the primary references.

Range: fire severity and fire duration.

2.3 The heat balance for a building compartment is explained in terms of the structure's materials and design in accordance with the primary references.

2.4 The method for calculating a fire load for a given compartment are identified in terms of the factors involved in accordance with the primary references.

element 3

Explain fundamentals of fire behaviour tests.

performance criteria

3.1 The methods used to predict the combustibility and toxicity of materials are identified and explained in terms of the relevant tests.

Range: non-combustibility tests, combustibility tests, toxicity tests, small-scale tests.

3.2 The methods used to predict the fire resistance of structural elements are identified and explained in terms of the relevant tests.

Range: fire resistance test furnaces, standard fire curve, testing procedures, testing conditions.

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3.3 The interpretation of test results, the pass or fail criteria for tests, and limitations of test methods are explained in terms of the factors involved in accordance with the primary references.

element 4

Explain fundamentals of fire growth models.

performance criteria

4.1 Available fire growth models are identified in terms of the type.

Range: FIRESYS, ASET-B, FPETOOL, FIRECALC, HAZARD I.

4.2 The limitations on computer modelling are explained in terms of programmed assumptions, data entry decisions and the limitations of mathematical models.

Comments on this unit standard

Please contact the Fire and Rescue Services Industry Training Organisation info@frsito.org.nz if you wish to suggest changes to the content of this unit standard.

Please Note
Providers must be accredited by the Qualifications Authority or a delegated inter-institutional body before they can register credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be accredited by the Qualifications Authority before they can register credits from assessment against unit standards.

Accredited providers and Industry Training Organisations assessing against unit standards must engage with the moderation system that applies to those standards.

Accreditation requirements and an outline of the moderation system that applies to this standard are outlined in the Accreditation and Moderation Action Plan (AMAP). The AMAP also includes useful information about special requirements for providers wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

This unit standard is covered by AMAP 0039 which can be accessed at http://www.nzqa.govt.nz/site/framework/search.html.