Kursus Penulisan & Penerbitan Buku Penyelidikan

10&11 Jun 2015

Rosli Hussin

Pengerusi Panel Buku Penyelidikan & Book Chapters
Penerbit UTM Press &
Jabatan Fizik, Fakulti Sains
Universiti Teknologi Malaysia, Johor

4

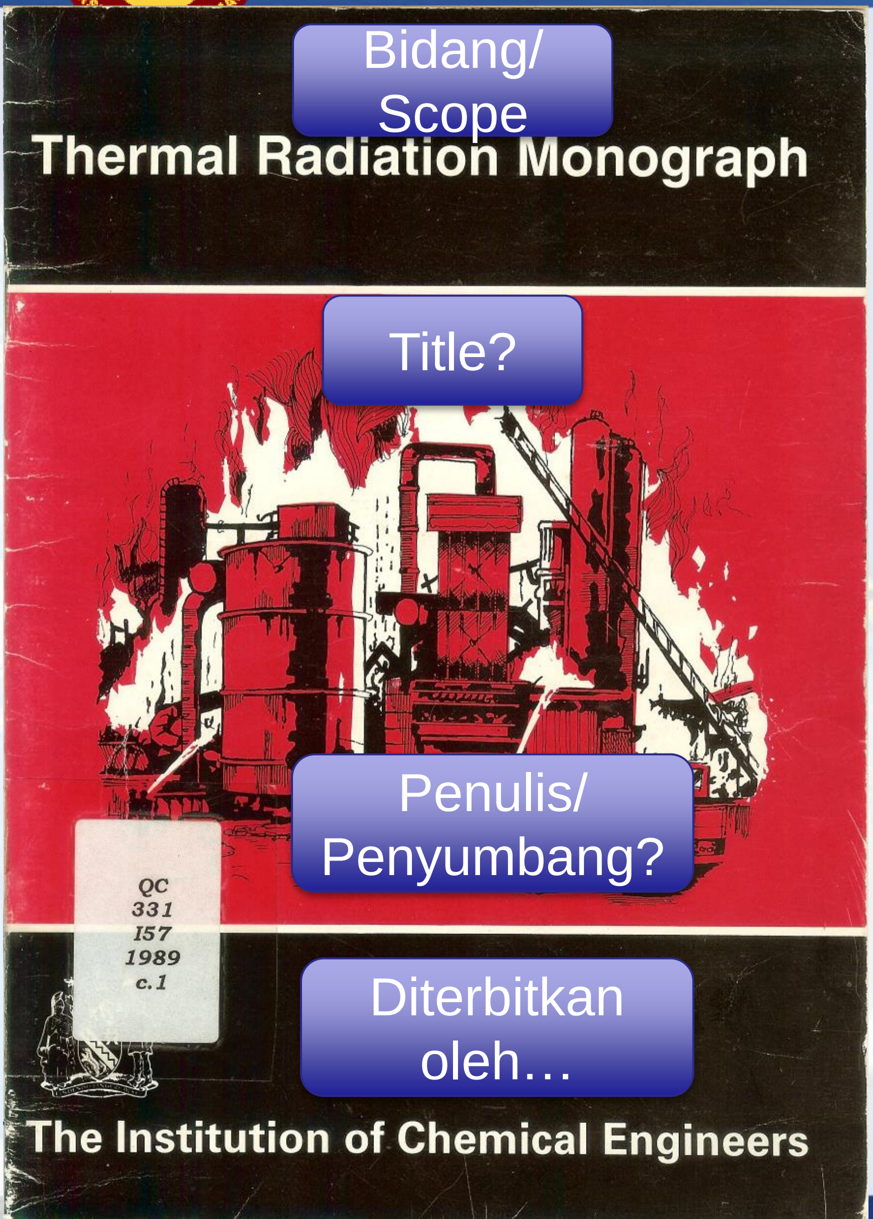
Monograph Examples & Analysis

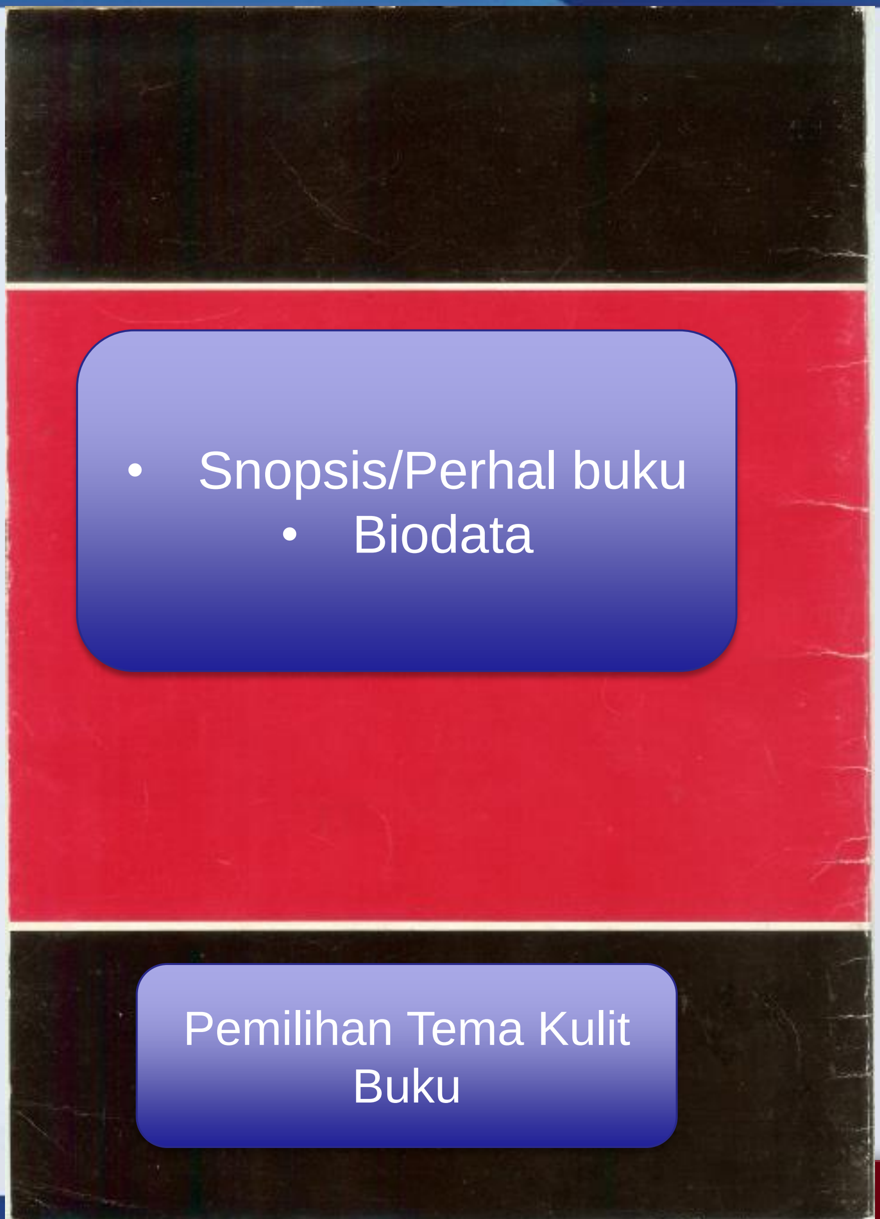
Outlines

- Structure of Research Book
- Write and Structure Your Manuscript - Learn from Example
- Function/Need Editor?
- Produce Good Research Book?

Contoh-1: Monograph

Laporan Penyelidikan





Title

CALCULATION OF THE INTENSITY OF THERMAL RADIATION FROM LARGE FIRES

First Report of the Major Hazards Assessment Panel — Thermal Radiation Working Group

Penulis

THE INSTITUTION OF CHEMICAL ENGINEERS

Halaman Penerbit

While every effort has been made to ensure accuracy and the working party has produced this document to the best of the skill and judgement of its members, no liability can be accepted by the Institution or by the working party or any of its members for any omission or inaccuracy or for any result occurring as a result of the advice or recommendation used in it being followed. Any person using it does so at his own risk and it is emphasised that should any special or unusual conditions exist, professional advice should be sought before adopting any of the recommendations.

Published by
The Institution of Chemical Engineers,
George E. Davis Building,
165-171 Railway Terrace,
Rugby, Warwickshire, CV21 3HQ, England.

Reprinted 1990

ISBN

ISBN 0 85295 236 8

"Inspiring creative and innovative minds"

PREFACE

The Major Hazards Assessment Panel was established in 1982 to provide a means for scientists and engineers, as professional people rather than as representatives of companies or other organisations, to comment on matters of current interest in the field of major chemical hazards. The full Panel, about sixty people, never meets. Instead a small Advisory Group selects subjects for study from among those suggested by members of the Panel, and Working Parties are set up to prepare reports on these subjects. The draft reports are sent to the full membership for comment.

The Institution of Chemical Engineers helped to set up the Panel and provides secretarial services but the Panel is not responsible to the Institution and it is not a committee of the Institution. The authority of the Panel's reports is due solely to the professional reputation of its members, particularly the members of the Working Parties.

This Working Group, on thermal radiation, was established by the Major Hazards Assessment Panel.

Membership of the Working Group

Members served on the Working Group in a private, non-representational capacity. Their principal professional interests are:

R. P. Pape (Risk assessment for regulation and control);
N. F. Scilly (Assessment of flammable and explosive substances);
F. K. Crawley (Risk assessment for the process industries);
I. Hymes (Risk assessment for the process industries);
J. Moorhouse (Combustion processes and behaviour of fires);
J. A. Eyre (Combustion of large spillages of flammables);
B. W. Platts (Medical aspects of accidents);
E. S. Johnson (Planning control of land use).

Penulis/ Penyumbang

CONTENTS

Preface

Symbol & unit

Indeks?

SYMBOLS AND UNITS

A	Constant, relates fireball diameter to mass; (dimensionless)
D	Pool diameter, or Fireball diameter; (m)
d	Distance from point source to receiver; (m)
e	Emissivity; (dimensionless, fraction)
E	Surface emissive power of flame; (kW/m^2)
f	Fraction of total heat of combustion which is radiated; (dimensionless)
F	Geometrical configuration factor; (dimensionless)
g	Gravitational constant; (m/s^2)
I	Incident flux of a surface; (kW/m^2)
I_o	Flux at source; (kW/m^2)
H_c	Heat of combustion per unit time; (kW)
K	Spectral absorption coefficient; (m^{-1})
l	Flame length; (m)
L	Atmospheric path length; (m)
m	Mass of fuel in fireball; (kg)
$\dot{m}$	Mass burning rate of fuel; (kg/s)
P	Pressure in liquefied gas container; (MPa)
R	Pool length; (m)
T	Flame temperature; (°K)
t	Duration of fireball; (s)

REFERENCES

1. Major Hazards Assessment Panel Working Group on Overpressure Effects, *Overpressure monograph: The effects of explosions in the process industries*, I.Chem.E., 1989.
2. American Petroleum Institute, *Guide for pressure-relieving and depressuring systems*, API Recommended Practice 521, Second Edition, September 1982.
3. J. H. McQuire, Heat transfer by radiation, Department of Scientific and Industrial Research and Fire Offices Committee, *Fire Research Special report no. 2* London: Her Majesty's Stationery Office, 1953.
4. F.D. Wayne and I.C. Kinsella, *ASME Winter Annual Meeting*, New Orleans, 84–WA/HT–74, 1984.
5. R.D. Hudson, *Infra Red System Engineering*, Wiley, New York, 1969.
6. P. L. Blackshear (ed), *Heat transfer in fires: thermo physics, social aspects, economic impact*, Wiley, 1974.
7. G. Hankinson, A method for calculating the configuration factor between a flame and a receiving target for a wide range of flame geometries relevant to large scale fires, *ASME Winter Annual*, New Orleans, 1984.
8. P. H. Thomas, The size of flames from natural fires. *9th Symposium (International) on Combustion*, Academic Press, NY : 844–859, 1963.
9. P. H. Thomas, *Fire Research Note No. 600*, Fire Research Station, 1965.
10. J. Moorhouse, Scaling criteria for pool fires derived from large scale experiments, *I. Chem. E. Symposium Series no. 71* : 165–175, 1982.
11. G. Cox and R. Chitty, *Combustion and Flame 60* : 219, 1985.
12. K. S. Mudan and P. A. Croce, A thermal radiation model for LNG trench fires, *ASME Winter Annual/HT–75*.
13. J. R. Welker and C. M. Sliepewich, *Fire Technology 2* : 127, 1966.
14. American Gas Association Report No. 15–3.1, November 1973.
15. P. P. K. Raj and K. Atallah, Thermal radiation from LNG fires, *Advances in Cryogenic Engineering*, 20 : 143, 1974.

Format Monograf

Fungsi Editor

Add Literature Review

Format

Improve style of Writing

CONTENTS

Bahagian Awalan?

INTRODUCTION

Methodology

Results & Discussion

Conclusion

Bahagian Akhiran

1. INTRODUCTION

This is the first report of the Working Group on Thermal Radiation of the Major Hazards Assessment Panel.

The terms of reference are:

"to consider what levels of thermal radiation (from continuous fires, flash-fires and BLEVE's) would be significant in an emergency at places to which the public have access, taking the probability of the emergency into account, and how the radiation levels should be calculated."

The Working Group will report in three stages as follows:

i. A description of various types of fire and methods for the calculation of the intensity and duration of thermal radiation in relation to the distance from the fire.

ii. The relationship between the amounts of thermal radiation received by people and the consequent injury levels including the risk of death.

iii. Factors influencing the choice of thermal radiation dose thresholds for the purposes of: emergency planning, control of public access and siting of installations.

2. TYPES OF FIRE

2.1 SCOPE

scope

This paper is mainly a [illegible] l fires which have the capacity to cause injury by the radiation of intense heat beyond the immediate flame boundary. Methods are described which may be used to calculate the intensity of thermal radiation at a given position in relation to a particular type and size of fire. For the purpose of this paper, no judgement is made about the probability of any particular fire situation. The paper begins with general comments on calculation methods, then it describes their application to different types of fire.

Fires may involve solids (eg wood piles, buildings etc); liquids (eg oil, petrol, alcohol etc) or gases (eg natural gas, process gases etc). In general the volatility of the fuel is one of the key parameters which determine the severity and speed of development of the fire (see Section 2.3).

Fires involving solids can, under some circumstances, present a significant hazard from thermal radiation outside the confines of the fires. However, such fires are usually relatively slow to build up, thus giving warning time; and the output of radiant heat is moderate, so that the range of the thermal radiation hazard is limited. Consequently, solid fires are not considered to constitute "Major Hazards" in the present context and are not included in this report. (Note: certain solids which are used as propellants for military applications are exceptionally fast-burning and these constitute special cases which are not covered here. Also, events such as the Bradford City Football Club fire show that warning-times may be short if a solids fire can spread over a wide area.)

The most severe types of fires are those involving highly flammable and highly volatile substances such as LNG, LPG or gases under pressure. Other flammable liquids may, however, give similar hazards if their volatility is increased by them being at elevated temperatures.

Any explosion effects associated with fires are not dealt with in this report. A companion paper on such effects has recently been published[1].

2.2 CLASSIFICATION OF FIRES

Chap 2

Release of liquids or gases from containment c [illegible] es of fires. These may be classified as pool fires, jet fires, flash fires, fireballs and firestorms.

i. POOL FIRE

A pool fire occurs when an accumulation of liquid in a pool on the ground or on water is ignited. A steadily burning fire is rapidly achieved since the fuel vapour required to sustain the flames is provided by evaporation of the liquid by the heat from the flames. For liquefied gases significant heat transfer from the surface on which the pool is

formed also contributes to the vaporisation of the fuel. The rate of consumption of fuel is dependent upon properties of fuel such as latent heat, and is equivalent to a pool depth regression in the range 6 to 13 mm/minute. The flames from pool fires behave entirely under the influence of their own buoyancy and are easily displaced by the wind.

ii. JET FIRE

A jet fire occurs when a flammable liquid or gas is released from a puncture or pipe into free air. The pressure of the release serves to generate a long flame which is stable under most conditions. Jet flames are largely unaffected by the wind. The duration of the fire is independent of the fire characteristics but is dependent on the release-rate and volume of the source. For a liquid or a two-phase jet a part of the liquid may "rain-out" of the jet giving rise to a pool fire.

iii. FLASH FIRE

A flash fire occurs when a cloud of flammable gas in a mixture with air is ignited. The shape of the fire is dependent upon the shape of the flammable cloud and the position of the ignition source. The fire is usually of short duration as the flame travels rapidly through the cloud. The velocity of the flame, which is usually a few metres per second, is dependent upon the gas concentration in the cloud and on the wind speed. Flash fires often serve as a way by which a remote source of ignition can lead to a jet or pool fire at the point of release. In certain circumstances it is possible for a flame to accelerate to a very high velocity, thus producing explosion effects[1]. This aspect is outside the scope of this document.

iv. FIREBALL

A fireball occurs when a quantity of flammable liquid or gas is suddenly released and is immediately ignited. The fuel is rapidly burnt as a spherical fireball which rises due to the initial momentum of the release and the high buoyancy of the hot flames. The initial fuel mass determines the fireball size and duration, and large fireballs are little affected by the wind.

Fireballs are known to arise following a BLEVE (boiling liquid expanding vapour explosion) in which fire induces heating and the subsequent failure of a pressurised storage vessel.

v. FIRESTORMS

In certain conditions, fire covering a very large area can produce a firestorm effect by inducing convection-driven winds which brighten the fire and propagate it by carrying sparks. There may also be significant damage and propagation by thermal radiation in such conditions. The scale of the phenomenon seems to exceed that of most installations, so it is not discussed further here.

2.3 THE SIGNIFICANCE OF VOLAT [illegible]

significance

The magnitude of the thermal radiation ari [illegible] ial depends on the rate and mass of gas or vapour released or produced by vaporisation of a liquid spill. For a liquid, volatility is a key factor in determining the type of fire, its

3. ~~METHODS FOR THE~~ CALCULATION OF THERMAL RADIATION

Three different types of method are available for calculating the thermal radiation levels at selected positions outside the flame envelope. Each method is a different level of complexity and each is suited to different types of applications. The major differences in method are reflected in the description of the source of radiation.

3.1 Point Source Method

The simplest way of estimating the thermal radiation levels from a fire is termed the point source model. In this technique a selected fraction f of the total heat of combustion is assumed to radiate in all directions from a single point. Incident flux I, at any distance d, is therefore given by

$$I = \frac{fH_c}{4\pi d^2}$$

where H_c is the heat of combustion per unit time. Values of f can be selected for different types of fires (see below).

The simplicity of the point source method is such that specific allowance is not normally made for the effects of atmospheric attenuation of thermal radiation by the atmosphere between the flame and receiver (see below). This is because it is normally inherently allowed for in the values selected for f. The advantages of this technique are its ease of use and its wide range of applicability.

A disadvantage is that for positions close to a flame (eg within 2 pool diameters in the case of pool fires) the incident radiation levels are underestimated. This may be particularly important for designing protective systems, planning fire-fighting response etc. Also precise values of f are not known for all types of fire, fuel types and size of fire and hence the accuracy is not high unless carefully tuned using experimental data. This has been done for some specific cases.

More refined point source methods have been developed for some special situations. See, for example, API 521[2].

3.2 SOLID FLAME MODEL

Some of the shortcomings of the point source model can be overcome using a solid flame model which assumes that the flame can be represented by simple solid geometrical shapes such as a cylinder, sphere or cone etc and that the radiation is emitted from its surface. Consequently, it allows a better assessment of the thermal

4. ~~APPLICATION OF METHODS~~ TO DIFFERENT TYPES OF FIRES

Analysis Types of Fire

4.1 POOL FIRES

A pool fire results when a pool of liquid fuel is ignited. The pool may be contained, for example, in a tank or bund, or spreading, as for example from a spill on to a flat surface such as concrete or water. In the latter case, the fire will be short-lived unless it is continuously fed with fuel, since the 'pool' will be very shallow. Another possibility is a spill of liquid into a trench or channel which may limit the spread.

Application of the solid flame model to calculate thermal radiation from a pool fire requires that the flame shape be approximated to a simple geometry to facilitate the calculation of a view factor. In the discussion below it is assumed that the pool position is known; it is beyond the scope of this report to discuss methods of calculating the spread of unconstrained pools.

The methods described in this section can be used for pools of liquefied gases such as LNG or LPG, as well as higher-boiling flammable liquids. With spills of liquefied gases the formation of a large quantity of vapour may occur before ignition, giving the possibility of a flash fire or even a vapour-cloud explosion. This section deals only with the combustion of the residual pool of liquid.

i. FLAME SHAPE CORRELATION

The shape most commonly chosen to represent a fire on a circular or low aspect ratio rectangular pool is a tilted cylinder. However, there are several possible variations on the cylindrical theme including an oblique cylinder of circular cross-section, a tilted cylinder of circular cross-section and an oblique cylinder of elliptical cross-section. Al

Perlu Transformasi→Monograf
Peranan Penulis & Editor

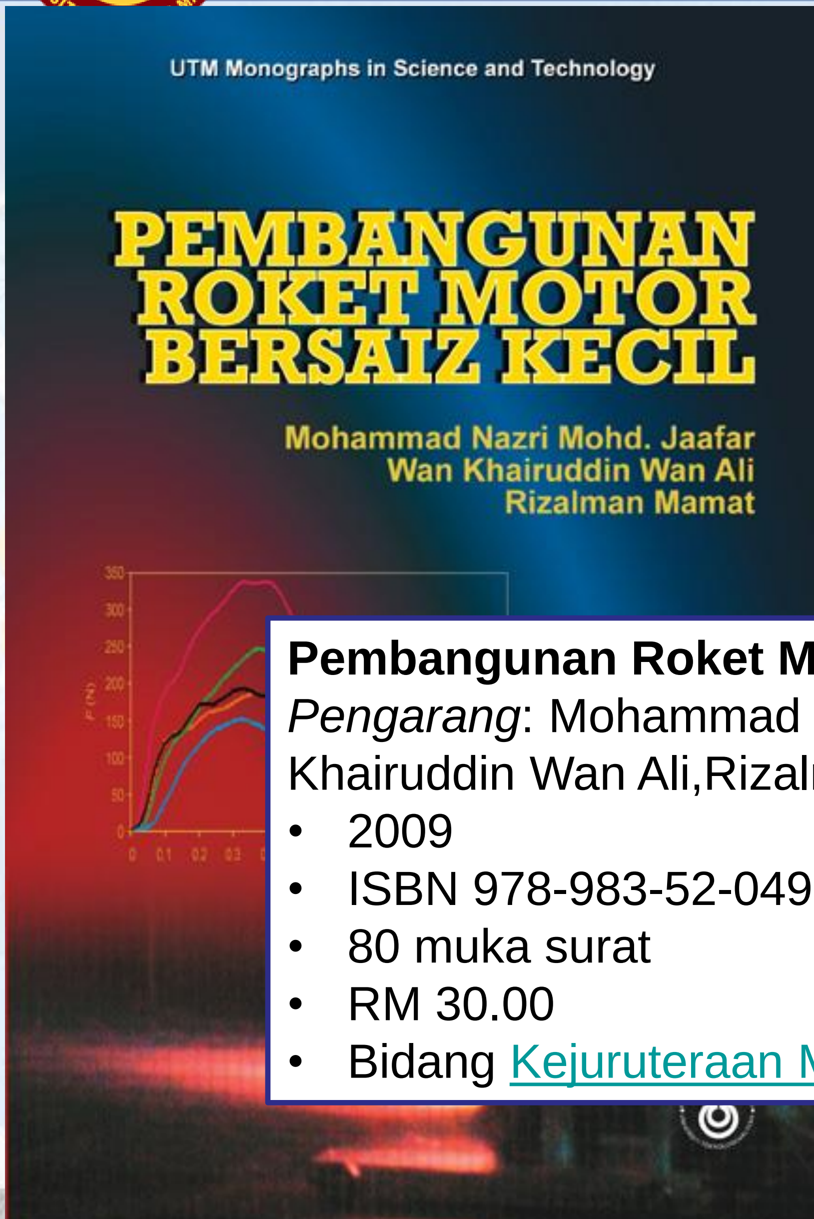
...nd nu... ...et ori...

To calculate the length of the flame l above the pool surface, correlations have been developed based on the size of the pool D (the pool diameter in the case of a circular pool or an equivalent diameter for noncircular pool) and the physical properties of the fuel. One of the most widely used correlations is that developed by Thomas[8]:

$$\frac{l}{D} = 42\left(\frac{\dot m}{\rho_a\sqrt{g D}}\right)^{0.6}$$

where $\dot m$ is the mass burning rate of the fuel
ρ_a is the ambient air density
g is the gravitational constant

Contoh-2



Pembangunan Roket Motor
Pengarang: Mohammad Nazri Khairuddin Wan Ali,Rizalman

- 2009
- ISBN 978-983-52-0496-8
- 80 muka surat
- RM 30.00
- Bidang Kejuruteraan Mekan

KANDUNGAN

Format -Thesis

Transform?

Contents?

Acknowledgment

Monograph of Thesis

Contoh-3

Ringkaskan Tajuk

Novel Solid–phase Microextraction Fiber Coating for the Forensic Detection of Accelerants in Arson Samples

Authors: Umi Kalthom Ahmad

- 2008
- ISBN 978-983-52-0486-9
- 99 pages
- RM 30.00
- Subject Science

Pemilihan Tema Kulit Buku ?

CONTE

Contents?

Format -Thesis

Acknowledgment