

Basic Elements of Safety SCC

Course book for the SCC exam (Basisveiligheid VCA)

Fourth Edition

bc. A.J. Verduijn

Contact information:

Verduijn.info
Prins Bernhardstraat 57
2841 TG Moordrecht
The Netherlands
E: info@verduijn.info
I: www.verduijn.info

Translation: Mattias Verduijn

With special thanks to Maika Sylva, Cora Verduyn and Chris Gray for checking the entire book for correct English.

The publisher has tried to ensure that all images and text fragments in this document are used in accordance with applicable copyright laws. Parties who nevertheless believe certain rights can be derived should address themselves to the publisher.

Revised Fourth Edition, January 2019

ISBN: 978-94-91595-28-8

©2019 All rights reserved, Verduijn.info.

Disclaimer

This book only serves as a preparation for the exam Basic Elements of Safety (B-VCA). Although the content of this book has been carefully composed and checked by experts, the author accepts no responsibility for any accidents or damage caused by incorrect information. The health and safety measures described here must always be interpreted and further elaborated in the context of a specific industry.

Table of Contents

1 VCA and Safety Legislation

1.1	Introduction	7
1.2	What is VCA?	8
1.3	H&S legislation	9
1.4	The authorities	13
1.5	Summary	15
1.6	Self-test	16

2 Risks and Prevention

2.1	Introduction	19
2.2	Risk	19
2.3	Risk sources	21
2.4	Cause and prevention of accidents	23
2.5	Safe working characteristics	32
2.6	Work permit system (werkvergunning)	33
2.7	Summary	37
2.8	Self-test	38

3 Fire and Explosion

3.1	Introduction	43
3.2	When does a fire occur?	44
3.3	Classification & extinguishing equipment	48
3.4	Environments with a risk of explosion	53
3.5	Summary	55
3.6	Self-test	56

4 Hazardous materials

4.1	Introduction	62
4.2	Intoxication hazard.....	62
4.3	Acute and chronic intoxication.....	63
4.4	Threshold values	64
4.5	Hazardous substances.....	66
4.6	Biological substances	69
4.7	Label.....	70
4.8	Measures to prevent intoxication	71
4.9	Danger of suffocation.....	73
4.10	Industrial gas cylinders.....	73
4.11	Oxygen concentration	75
4.12	Summary	76
4.13	Self-test	77

5 Equipment

5.1	Hand tools	83
5.2	Power tools.....	85
5.3	Powered hand-held tools	86
5.4	Fixed machines.....	92
5.5	Hoisting	94
5.6	Forklift truck	99
5.7	Pallet trolley	100
5.8	Summary	101
5.9	Self-test	102

6 Specific activities and circumstances

6.1	Introduction	109
6.2	Confined spaces	110
6.3	Working at a height	115
6.4	Welding and cutting	122
6.5	Demolition	124
6.6	Summary	126
6.7	Self-test	127

7 Electricity

7.1	Hazards.....	131
7.2	Passage of current through the human body.....	132
7.3	Short circuit.....	134
7.4	Static electricity.....	135
7.5	Safety measures when working with electricity.....	136
7.6	Temporary electrical equipment.....	138
7.7	Summary.....	139
7.8	Self-test.....	140

8 Prevention

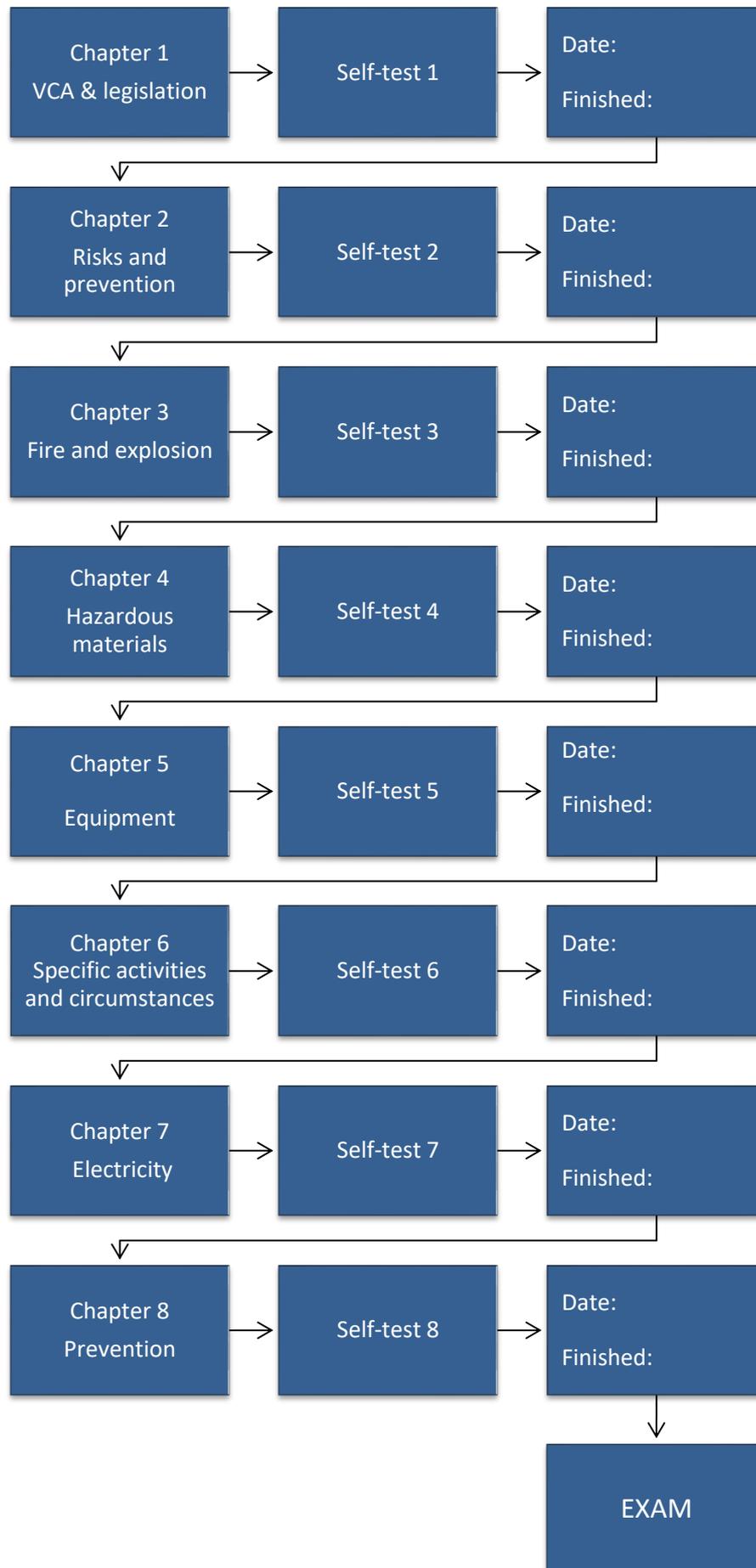
8.1	Introduction.....	145
8.2	Physical load.....	146
8.3	Stumbling and tripping.....	147
8.4	The workplace and noise.....	147
8.5	Personal protective equipment (PPE).....	149
8.6	Signage.....	160
8.7	Summary.....	162
8.8	Self-test.....	163

9 Pre-exam..... 169

Annex 1: Answers..... 179

Annex 2: Illustrations 181

Index 182



1 VCA and Safety Legislation

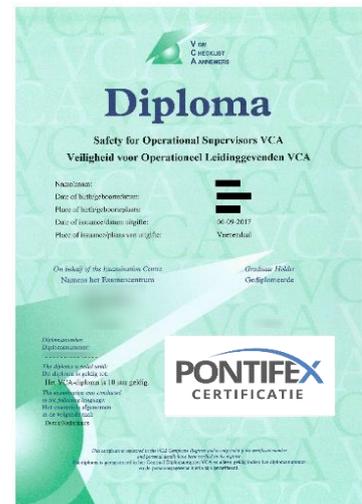
- 1.1 Introduction**
- 1.2 What is VCA?**
- 1.3 H&S legislation**
- 1.4 The authorities**
- 1.5 Summary**
- 1.6 Self-test**

1.1 Introduction

B-VCA

Welcome to the: Basic Elements of Safety VCA course. In this course you will be trained for the Basic Elements of Safety or B-VCA certificate. In order to receive this certificate you will have to pass an exam. This exam consists of 40 multiple choice questions. In order to pass the exam you must answer at least 64.5% of these questions correctly.

This course consists of 9 chapters. At the end of each chapter there is a self-test. When you pass this test you may continue to the next chapter. A diagram of this is shown on the left page. There are eight chapters in this course, each with a self-test at the end. You go through each chapter in the same way. When you have completed the self-tests and have gained good results for the practice exam, you are ready to do the VCA exam.



Schedule

Studying is the most effective when you set goals for yourself. Therefore, start by making a schedule. Write down in the diagram on the left page when you think you are going to finish with that chapter. Everybody learns at a different speed but as a

guideline you can expect to need 2 hours of study per chapter. When you have successfully completed a chapter and its self-test, fill in the box at the end of the row. This way you will have a good overview of your progress.

1.2 What is VCA?

VCA certification

People need a safe and healthy way to do their work. Therefore when it comes to working there is increasing focus on safety, health and the environment. The VCA certification has been introduced to test companies in these areas.



VCA's definition:

- **VGM**
(veiligheid, gezondheid en milieu = safety, health and environment)
- Checklist for
- Aannemers (building contractors)

Safety System

The VCA certification consists among other things of a list of questions which is used as a screening system for building contractors. Building contractors are companies that perform construction activities for others (employers). VCA is a complete system that allows the service provider to demonstrate that when carrying out works, sufficient attention is paid to safety, health and environment. Such a system is called a safety management system. The purpose of VCA certification is the prevention of incidents. An incident is an accident with or without any damage or injuries.

The VCA certification is intended for companies whose employees perform risky activities or work in risky environments such as factories or construction grounds.

There are three levels of VCA certification, depending on the kind of company:

- VCA* (one star) is aimed at direct H&S (health and safety) care in work-floor activities.
- VCA** (two stars): On top of the VCA* requirements, the safety structures and systems are also checked.
- VCA Petro-chemistry: The strictest requirements apply for companies that perform risky activities in the petrochemical industry in addition to the VCA** requirements.

More and more companies are requiring from subcontractors that they are VCA certified. This way the company can show that it works according to the VCA rules. A part of this certification is that all those involved have the appropriate VCA certification. These are:

- For employees:
Basic elements of Safety SCC (B-VCA)
- For operational supervisors:
Safety for Operational Supervisors SCC (SOS-SCC) (VOL-VCA)
- For intermediaries or supervisors of temporary employment agencies:
Safety for Intermediaries and Supervisors SCT (VIL-VCU)

Basic Elements of Safety This course will train you for the Basic Elements of Safety certificate.

1.3 H&S legislation

Health and Safety

H&S stands for **H**ealth and **S**afety. In the Netherlands we are mainly concerned with the following laws:

- The working hours legislation
- The 'ARBO' law
- Environmental legislation
- European Directives

These laws apply everywhere where people work, so they apply to both employers and employees. Interns, trainees, temporary agency workers and volunteers are treated as employees in these laws.



The working hours legislation

Resting Times

In the working hours legislation rules are included for work and resting times. The starting point of the law is the need to consider the personal and familial circumstances of the employee, like family care and a connection with health and safety. This law indicates the maximum working hours per day and per week for each age group. Compliance is verified by the authorities.

Labour Conditions Law ('ARBO' law)

Accidents

Every year more than 50.000 accidents happen in which 3224 people are seriously injured and about 100 people die. The FNV (Dutch trade union) estimated in a report from 2010 that a further 3000 people die per year through consequential damages of working conditions! Think of working with chemicals or with asbestos or

coming into contact with infectious diseases such as Q fever. To improve working conditions in the workplace the ARBO law applies in the Netherlands.

Principle

The principle of the ARBO law is a matter for employers and employees together. To constantly improve working conditions, two types of consultation exist (both with an agenda and minutes of the meeting).

- HSE (**H**ealth, **S**afety and **E**nvironment) meetings (toolbox meetings) where employers and employees come together to examine how working conditions can be improved.
- Dialogue between the employer and an employee representation. At this consultation, the following persons participate: the employer (Chairman), a delegation of employers, a delegation of employees and a delegation of experts (for example prevention consultants).

Teamwork

Employers and employees have to cooperate for the best labour conditions and environmental protection.

This means that in the work area:

- There is no danger to health and accidents are prevented.
- Employees are protected from violation, harassment and undesired sexual behaviour and violence.
- The environment is protected as much as possible.

The ARBO law contains the duties and rights of both employers and employees.



Obligations of the employer

The employer is responsible for improving the health, safety and welfare of the employees and therefore has a prevention policy in place, integrated in the company policy. Parts of this are:

- A system-based prevention plan and execution of the policy by means of a system.
- Establishing an internal prevention department.
- Risks must be prevented as much as possible.
- Organises consultations and works together with the employee (representation).
- Performing a written risk analysis.
- Coordinating the collaboration of multiple employers in one area.
- Preventing accidents at the source.

day with paint containing solvents to an individual who paints his window frames once every four years.

- Size of a possible injury or damage: impact (I)

When a roofer works on the roof of a skyscraper, the probability (P) of falling over the edge is not high. However, the possible injury is very serious, therefore the risk is large and fall protection is required.

Expressed as a formula:

$$R = P \times I$$

Risk = Probability x Impact

Job Hazard Analysis (JHA)

(Job) Hazard Analysis

A (Job) Hazard Analysis (TRA) is a risk analysis of the hazards associated with performing high-risk activities. The Task Risk Analyses pays attention to both safety and health of workers and the environment. By examining this beforehand, measures can be taken to reduce the risks to a minimum.

RI&E

Employers are required by the ARBO-law to identify the risks in their company. They must indicate in an action plan what measures are necessary. In a risk inventory and evaluation (RI & E), these issues must be recorded in writing. This way employers and employees work together for a safe and healthy business climate.

The RI&E consists of the following steps:

1. Identification of hazards.
2. Identification of risk.
3. Evaluation of risks.



LMRA: Last minute risk analysis

LMRA

The RI & E are performed by experts or supervisor. A risk inventory that anyone can perform is the **Last Minute Risk Analysis (LMRA)**. This takes only one minute. You can perform a LMRA yourself before the start of the work or change of working conditions. It is the last check needed before you start to work, where you take the following three steps:

1. Which risks are still there, despite all precautions? Ask yourself what can happen to you during the job. What is the probability that the risk occurs and what is its impact?
2. Which measures can be taken to eliminate remaining risks or make them acceptable?
3. Put those measures into action.

Some companies work with LRMA cards. In these cards, you write down that you have taken the above-mentioned steps.

2.3 Risk sources

At work the following risk sources exist.

Type of work:

- Working with hazardous substances.
- Working with dangerous machines/tools.
- Working with high pressures.
- Working with dangerous radiation.

In the work area:

- Working at height.
- Working with electricity.
- Fire or explosion hazard.
- Working in the cold/heat.
- Working in noisy conditions.
- Insufficient light.
- Untidy workplace.



Fig.3: Working at height as a risk source

Knowledge and skills of the employee:

- Not enough experience.
- Lack of training.
- Lack of information.

Attitude and behaviour

Show-off behaviour, being in a hurry and disinterest increases the risks. Working without a work permit where it is required also increases the risks.

Welfare / wellbeing

People who do not like their work are less concentrated and therefore create more risk. It is therefore important to avoid boring work and to encourage contact with colleagues. This will benefit the wellbeing of the employee and therefore their safety.

Resources

The better the quality of the equipment that is used, the safer the workplace.

2.4 Cause and prevention of accidents

Terms

Before we start talking about prevention, first some definitions are given.

- Safety is the intentional taking of acceptable levels of risk.
- An accident is an unwanted event, which results in damage or injuries.
- A near-accident is an unwanted event that does not result in damage or injuries.
- An incident is an accident with or without injury.

The accident theory of Lateiner

Human failure

Almost every accident is directly or indirectly caused by human failure. According to research 80% of all accidents are caused by direct human actions. The remaining 20% are caused by unsafe situations. In the majority of cases (18%) these situations are in turn caused by a previous human activity.

Because 80% of accidents are caused by human behaviour, we will go into this in more detail. In the 1930s, two scientists: Lateiner and Heinrich developed a theory which is called the accident theory of Lateiner. Lateiner thought about how an accident occurs. He uses 5 dominoes to illustrate this.



Fig. 4: The accident theory of Lateiner

An accident never comes out of nowhere but there are usually fundamental reasons behind it. These are the first three dominoes. Therefore, it is best to get involved in these first three dominoes. Once we arrive at domino 4 and 5 the size of the injury can only be reduced.