



Training Kit on Co- Processing Waste Materials in Cement Production

Brochure

A GTZ-Holcim Public Private Partnership



Version	v1.0	Contact e-mail	dieter.mutz@fhnw.ch
Date	10.11.2008		

Table of contents

- A training kit on co-processing waste materials in cement production3
- 1 Why can co-processing contribute to sustainable development?3
- 2 Why a training a kit for co-processing?4
- 3 What is the educational objective of the Training?4
- 4 Who should participate at the training?5
- 5 What are the learning targets of the training?5
- 6 Which didactic concept will be applied?6
- 7 Which topics will be trained in the Modules?6
 - 7.1 Module 1: Introduction.....6
 - 7.2 Module 2: Waste management6
 - 7.3 Module 3: Understand cement production.....6
 - 7.4 Module 4: Application of Pre- and Co-Processing in Cement Production6
 - 7.5 Module 5: Occupational Health and Safety7
 - 7.6 Module 6: Legislation and Permitting.....7
 - 7.7 Module 7: Corporate Social Responsibility and Communication7
 - 7.8 Module 8: Life Cycle Assessment in the Cement Industry.....7



A training kit on co-processing waste materials in cement production

In a joint initiative the Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (GTZ) and Holcim Group Support LTD (Holcim) have developed guidelines on co-processing waste materials in cement production¹. These guidelines provide information to public authorities, private enterprises, non-governmental organizations etc. on the use of waste material as an alternative resource for energy and material recovery in an environmentally sound manner. The implementation of this expertise requires capacity building of the involved stakeholders to achieve the full benefit of co-processing.

GTZ and Holcim have developed and compiled a modular training kit designed to teach relevant staff.

In addition to these guidelines GTZ and Holcim have developed and compiled a modular training kit designed to teach relevant staff from the public and private sector on the topic of co-processing. The training kit takes into consideration the specific framework conditions in emerging and developing countries and will enable participants to understand the benefits, risks and opportunities of co-processing as a contribution towards sustainable development.

1 Why can co-processing contribute to sustainable development?

Poor waste management is an issue in developing countries and in countries in transition. In many of these countries, waste is discharged to sewers, buried or burned on company premises, illegally dumped at unsuitable locations or taken to landfills that fail to meet requirements for the environmentally sound final disposal of waste. This can cause contamination of soil, water resources and the atmosphere, leading to the sustained deterioration of the living conditions and health of the adjacent populations. Toxic substances and persistent compounds escape into the environment, are spread through the air over large areas and can enter the food chain, affecting human and animal health.

Co-processing is the use of waste material as raw materials or as a source of energy, or both, to replace natural mineral resources and fossil fuels such as coal, petroleum and gas in industrial processes.

One proven alternative and possible solution is the co-processing of selected waste materials in the cement industry. An efficient cement kiln can provide an environmentally sound and cost-effective treatment or recovery option for a number of wastes.

¹ Holcim, GTZ: Guidelines on Co-Processing Waste Materials in Cement Production – The GTZ-Holcim Public Private Partnership, 2006



The use of alternative fuels and raw materials (AFR) in cement kilns can decrease the environmental impacts of wastes, safely dispose of hazardous wastes, decrease greenhouse gas emissions, decrease waste handling costs and save money in the cement industry. It will help in achieving the targets set in Agenda 21 of the "Earth Summit" in Rio de Janeiro (1992) and the Johannesburg Declaration on Sustainable Development (2002).

To promote co-processing of waste in cement kilns the Deutsche Gesellschaft für Technische Zusammenarbeit GmbH, and Holcim Group Support LTD formed a strategic alliance in 2003. Holcim is a worldwide leading supplier of cement and aggregates as well as value-adding activities such as ready-mix concrete and asphalt, including services. GTZ is an international cooperation enterprise for sustainable development with worldwide operations. The cooperation of GTZ and Holcim developed guidelines on co-processing that include the basic rules and principles that have to be observed when co-processing waste materials.

2 Why a training a kit for co-processing?

The "Guidelines on Co-processing of Waste Materials in Cement Production" provide expertise on legal, technical, social, environmental and financial aspects of waste management in general and co-processing in particular. But they should not be understood as a "copy paste" instruction for the implementation of co-processing in a country. In the Guidelines, the need for capacity building on the above mentioned aspects is described to empower the involved stakeholders in a country to achieve the benefits of co-processing.

Co-processing requires capacity building on environmental, operational, legal, occupational health and safety, social and communication aspects.

The training kit consists of several practice orientated modules which allow taking the specific framework conditions in emerging and developing countries into consideration. The modules contain slides for presentation, an accompanying textbook with instruction advice for the trainer and additional training material such as practical exercises, case studies etc. According to the requirements of the participants on capacity building, the most useful modules can be put together for specific training.

3 What is the educational objective of the Training?

The overall educational objective of the training is to contribute to the improvement of a country's waste management practices.

Participants will be able to apply different tools to implement and supervise co-processing successfully.



Participants of the training should understand the benefits, risks and opportunities of co-processing as a contribution towards sustainable development. They should be able to apply the different tools to implement and supervise co-processing successfully.

4 Who should participate at the training?

The first training package is aimed at public authorities at national, regional and local level and Non-Governmental Organizations (NGOs) dealing with the issue of waste management and co-processing.

Participants at the training sessions from the public sector could be responsible, for example, for the development of waste management strategies and waste master plans, accompanying licensing processes, elaboration of the required legal framework, monitoring of environmental performance and compliance, the inspection of occupational health and safety standards or environmental communication.

This training package is aimed at public authorities and Non-Governmental Organizations NGOs.

Training for NGOs will be addressed to those experts who are dealing with the validation of environmental technology, environmental education or policy development.

At a later stage the target group could be extended to cement operators, waste handling companies and to waste generators.

5 What are the learning targets of the training?

The training targets are based on the requirements for capacity building as stipulated in the guidelines mentioned above. Over all the modules of this specific training kit, these are:

- formulation of waste management policies
- formulation and interpretation of waste statistics
- authorization and controlling of co-processing
- assessment of new materials for co-processing and waste source qualification
- monitoring of operation and transportation (methodologies of emission analysis and evaluation of analytical data)
- management of occupational health and safety of the workers within the cement plant and during transportation
- enforcement of the national regulations and permissions
- systematic communication with stakeholders and the public



6 Which didactic concept will be applied?

To achieve the targets of the training modern teaching methodologies will link theory and practice and will broaden and integrate the knowledge rather than increasing the depth in a specific domain.

Each module consists of a set of around 30 slides and a guiding textbook for the trainer and participants and additional information. It also includes case studies, exercises and audio-visual material.

7 Which topics will be trained in the Modules?

The training is split into an introduction module and eight thematic modules (modules 2 to 8) which cover the different topics of co-processing waste in cement kilns:

The thematic modules cover the topics stipulated in the “Guidelines on co-processing waste material in cement production”.

7.1 Module 1: Introduction

This Module gives background information on co-processing as a holistic approach in the context of international conventions and Industrial Ecology. Opportunities, benefits and risks of co-processing will be discussed.

7.2 Module 2: Waste management

This module contains basic information on solid waste management. Objectives and motivation is discussed, waste definition and characteristics, waste management strategies and treatment technologies are presented. Further legal frame and the development and implementation of solid waste management systems are described.

7.3 Module 3: Understand cement production

The cement industry in particular, due to its nearly global presence and its process-inherent advantages, lends itself optimally for co-processing waste derived/alternative fuels and raw materials. To understand co-processing this training module provides a short introduction to the basics of cement chemistry, cement process technology and to those special process characteristics which render the cement kiln option rather unique in this application.

7.4 Module 4: Application of Pre- and Co-Processing in Cement Production

The optimal use of alternative fuels and raw materials (AFR) in the cement kiln needs specific environmental, technical and operational prerequisites. Often a preparation process (pre-processing) is needed and the AFR must be fed to the kiln via appropriate feed points and in adequate proportions. AFR quality and cement kiln emission control system must be implemented. This Module deals with the aspects for an environmental sound pre- and co-processing.



7.5 Module 5: Occupational Health and Safety

AFR constitutes many different materials coexisting in different states. This may include hazardous or recovered wastes which can be in solid, semi liquid, liquid or even gaseous states. Exposure to individual materials or combined may lead to health risks or may be life threatening.

This module gives an overview of how developing and implementing specialized procedures and process/risk analysis with regards to acceptance, handling, storage, pre-processing and co-processing of AFR helps to co-process it in a safe manner that can be beneficiary to the environment and humans by thermally transforming the hazardous properties into the energy and minerals needed to produce cement.

7.6 Module 6: Legislation and Permitting

Co-processing can be part of a sound waste management strategy in emerging countries. However, such a strategy needs to be based on a sound legal and regulatory framework. Only then acceptance of the public will be reached. This Module deals with the legal framework and the permitting of co-processing to ensure that potential negative effects on the environment are prevented or limited as far as possible.

7.7 Module 7: Corporate Social Responsibility and Communication

This module contains the basics of corporate social responsibility (CSR) and sustainable development (SD) together with tools and instruments to improve communication and dialogue with partners and stakeholders to assure the public acceptance of co-processing.

7.8 Module 8: Life Cycle Assessment in the Cement Industry

Co-processing recovers energy and heat from waste, conserves non-renewable resources, may reduce emissions. Environmental burdens from waste co-processing may come from additional requirements to prepare the wastes before feeding them into the kiln. In addition, wastes with a high content of heavy metals may lead to increased air emissions of volatile heavy metals (e.g. mercury) and the accumulation of low volatile heavy metals in the cement.

This Module gives comprehensive information on life cycle assessments (LCA) as a useful tool to compare co-processing with other waste treatment alternatives according their benefits and losses.