

EMPIES SCIENTIFIC ASSOCIATION

Basic e-learning courses on: PREVENTION AND MANAGEMENT OF THE OCCUPATIONAL BIOMECHANICAL

FORMATIVE BASIC TRAINING ON BIOMECHANICAL OVERLOAD: general presentation

This preliminary basic training path (in English) is dedicated to the study of the work-related biomechanical overload that represents the first occupational risk in the world. The evaluation of exposure risk is made according to the most recent ISO Standards and Technical Reports.

Content of the Basic training: 5 courses

This formative path has 4 courses on the study of exposure assessment :1) OCRA checklist method for risk assessment of repetitive movements of the upper limbs 2) NIOSH- update lifting index (LI-CLI-VLI) for manual lifting evaluation; 3) ERGOCHECK for pre-mapping all the major occupational discomforts with indications on the intervention priorities; 4) New TACOS method for evaluating awkward postures of lower limbs and spine; 5) SPECIAL ERGOCHECK for preliminary mapping of risk in civil construction and agriculture.

Course structure

The courses are all structured with 50% theoretical and 50% application part (exercises). The courses include many videos illustrating working realities, taken as a basis for risk assessment. The risk evaluation is performed by means of free downloadable spreadsheet in Excel specifically prepared.

goals and users

The main goal is to transfer knowledge and skill for management of occupational biomechanical overload risk, in compliance with international Standards. It is dedicated to different professional figures (also not expert in ergonomics) like company technicians, occupational medical doctors, occupational physiotherapist, security technicians, etc.

You can follow the whole path or even the individual courses, but in the suggested order

TEACHER NOTES

Presentation of THE AUTHOR (see to the presentation of the author in film)

I am Daniela Colombini, teacher of the courses and author of the risk assessment methods presented.
I am occupational medical doctor, epidemiologist and European ergonomists.
Our association (EPM ergonomics of posture and movements), of which we are President and scientific director, dealing since more than 30 years with prevention and management of work-related biomechanical overload risks.



TEACHING MATERIAL (EXCEL SOFTWARE)

The management of all the risk assessment data collected and the relevant risk score calculations can be so complex that "simple tools", i.e. Excel® spreadsheets ([freely downloadable at www.epmresearch.org/free-software-in-english](http://www.epmresearch.org/free-software-in-english)) have been developed for gathering, managing and processing the data. This tools (present in different calculation model for biomechanical overload estimation) are employed to implement the strategy we have developed for calculating the risk arising from .
During the 4 courses specific free software will be provided with which exercises will be done

HOW TO FOLLOW THE COURSE

We recommend using a computer with 2 screens or two computers, one to follow the lesson and one to do the exercises.

PROFESSIONAL FIGURES TO WHOM THE COURSE IS DEDICATED

The tool is primarily designed to be used by employers, OSH operators, trade union representatives, but it may also be useful for occupational medical staff conducting periodical inspections and drafting health surveillance protocols, and for supervisory bodies (labour inspectors) conducting inspections in the workplace needing to rapidly detect potentially dangerous situations requiring specific preventive interventions.

GOOD WORK TO ALL:

WELCOME TO LIVE WITH US THE ADVENTURE OF THE PREVENTION

With the suggested exercises , the course can last 12-16 hours



For the evaluation
of biomechanical overload
of the upper limbs



OCRA CHECKLIST

AIM OF THE COURSE

This first course in English is dedicated to the study of the work-related biomechanical overload of upper limbs, that represents the first professional risk in the world and that is consequently the cause of the most numerous work-related diseases. **this basic course will deal only with "OCRA checklist".**

The main aim of the course is to transmit the necessary knowledge:

- to apply the up to date European (CEN) and international (ISO) standards concerned,
- to determine quickly what proportion of tasks can be classified as green (no risk), yellow (significant or borderline risk), red (medium risk) or purple (high risk),
- to produce an initial map of the risk related to repetitive work,
- to determine priorities for ergonomic improvement,
- to reintegrate workers with musculoskeletal diseases,
- to discuss the presence or absence of causal links between the level of risk exposure and musculoskeletal disorders for occupational diseases reporting,
- to predict the probability of getting musculoskeletal occupational diseases of the upper limbs (UL_WMSDs,
- application examples are proposed making use of spreadsheets in Excel, prepared by EPMIES, which can be downloaded for free by the EPMIES web site (www.epmresearch.org).

In practice, the OCRA method allows the management of biomechanical overload risk of the upper limbs at 360 degrees, in compliance with international standards to different professional figures (also not expert in ergonomics) like company technicians, occupational medical doctors, occupational physiotherapist, security technicians, etc.

COURSE CONTENTS: STRUCTURE OF THE OCRA CHECKLIST COURSE

The course is divided in different chapters, each dedicated to different risk factors and / or calculation procedures making part of the checklist OCRA method. The different chapters are separated and may be accessed from the index of the course:

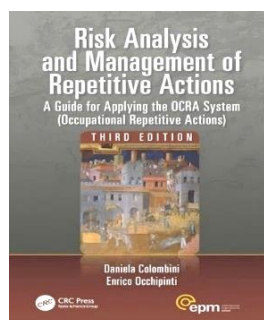
- 1-GENERAL INTRODUCTION
- 2-STUDY OF WORK ORGANISATION, MAIN DEFINITION
- 3-FREQUENCY
- 4-FORCE
- 5-AWKWARD POSTURES
- 6-ADDITIONAL RISK FACTORS
- 7-FINAL RISK
- 8-MULTITASK ANALYSIS
- 9-MAPPING THE RISK

RECOMMENDED READING: the course manual

Risk Analysis and Management of Repetitive Actions: A Guide for Applying the OCRA System (Occupational Repetitive Actions), Third Edition

Daniela Colombini, Enrico Occhipinti

November 08, 2016, CRC press, Taylor & Francis



Features

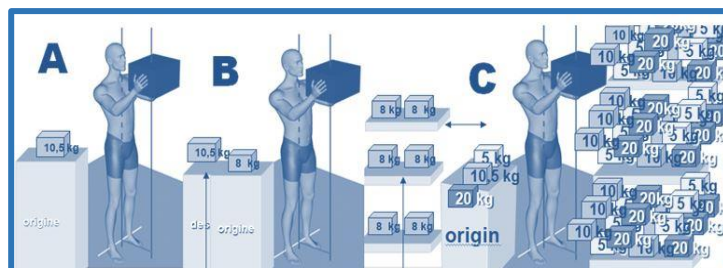
- OCRA method and tools.
- Presentation of different tools in relation to different needs tools (downloaded for free)
- Analysis of rotations between multiple repetitive tasks.
- Several examples of applications.
- Role of occupational physician in risk management: health surveillance techniques and affected workers re-allocation.

Summary

This book covers the application of the OCRA (Occupational Repetitive Actions) method. The methods make up a system dedicated to the analysis and management of the risk of biomechanical overload of the upper limbs. The book focuses on the OCRA checklist which presents various models from the most simplified, to the most complex. It describes methods, criteria, procedures and tools on how to perform such an assessment, in line with international standards. The book provides you with the correct methods and tools for prevention of upper limb work related musculoskeletal disorders no matter what the working environment is or what the international standards dictates.

With the suggested exercises , the course can last 12-16 hours

**A GUIDE TO STUDYING SIMPLE AND
COMPLEX LIFTING TASKS USING
UPDATE NIOSH LIFTING EQUATION
(LI, CLI, VLI)
for evaluating biomechanical
overload of spine**



AIM, MAIN CONTENTS AND CRITERIA

This course aims to offer a useful guidance and tools (spreadsheets in Excel free download) on how to analyse and evaluate the intricate lifting functions for preventing injury during their execution.

Based on the practical experience of the authors, the manual should **help users to apply both the international standards ISO [ISO 11228-1, 2003] and the RNLE (Revised NIOSH Lifting Equation)**

The tools were created by EPM with the support of a qualified group of co-workers in various European countries, based on extensive field experience. For over 10 years now EPM has worked with researchers at the NIOSH, primarily Thomas Waters, the principal author of the RNLE, to develop theoretical models and application tools for the **update the criteria to study of complex manual lifting tasks (variable and/or sequential, manual lifting situations commonly present in all warehouses, supermarkets, construction, agricultural works, etc.)**. Variable and sequential tasks today represent the latest evolution of the original RNLE [WATERS, 2003] and have become the reference method for international standards.

COURSE CONTENT

INTRODUCTION AND MANUAL LIFTING NIOSH GENERAL MODEL
MANUAL LIFTING EVALUATION: MONO-TASK ANALYSIS CRITERIA AND APPLICATION EXAMPLES
MANUAL LIFTING EVALUATION: COMPOSITE-TASK ANALYSIS CRITERIA AND APPLICATION EXAMPLES
MANUAL LIFTING EVALUATION: VARIABLE-TASK ANALYSIS CRITERIA AND APPLICATION EXAMPLES
MANUAL LIFTING EVALUATION: SEQUENTIAL-TASK ANALYSIS CRITERIA AND APPLICATION EXAMPLES
FINAL LIFTING INDEX CLASSIFICATION
ISO STANDARD ON MANUAL LIFTING (version 2003, new version in 2021)
ISO STANDARD ON CARRYING (version 2003, new version in 2021)
EXERCISES

MAIN FEATURES

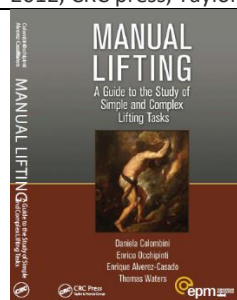
- Presents applications of RNLE for all types of lifting tasks.
- Explains procedures and applications with examples.
- Defines different types of lifting tasks, with instructions on how to analyse each.

RECOMMENDED READING: the course manual

Manual Lifting: A Guide to the Study of Simple and Complex Lifting Tasks

Daniela Colombini, Enrico Occhipinti, Enrique Alvarez-Casado, Thomas R. Waters

2012, CRC press, Taylor & Francis



Features

- Presents applications of RNLE for all types of lifting tasks
- Includes a special chapter devoted to procedures for Active Health Surveillance of workers who perform manual handling tasks.
- Explains procedures and applications with examples.
- Defines different types of lifting tasks, with instructions on how to analyse each.

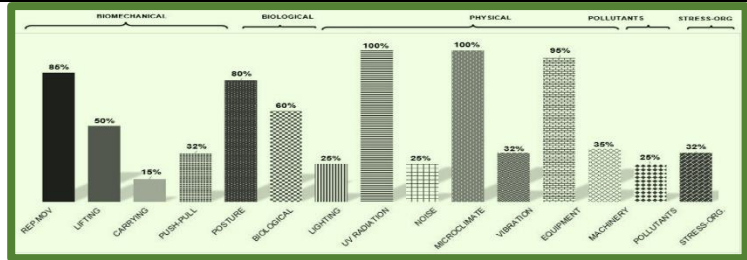
Summary

Commonly used throughout the world, manual lifting tasks—whether simple or complex—all involve variable loads, postures, and movements. This practical guide discusses how to analyse the intricate lifting function and prevent injury during its execution. Outlining revised NIOSH Lifting Equation (RNLE) methods, the book illustrates their use in assessing manual lifting tasks of varying degrees of difficulty. Using examples to reinforce presented concepts, it explains how RNLE methods can be applied to evaluate single, composite, variable, and sequential lifting tasks. It also explores how to interpret and apply the results according to international standards and guidelines.

With the suggested exercises , the course can last 12-16 hours

ERGOCHECK

a simple tool model for pre-mapping all the main occupational discomfort



MAIN CONTENTS

The aim here is to suggest a methodology and a comprehensive simple tool (ERGOCHECK, downloadable for free from the website www.epmresearch.org) for bringing together various potential risk factors to undertake a preliminary mapping of discomfort/danger in the workplaces and to assess consequent priorities for prevention, especially (but not only) in small and very small businesses.

The procedure presented here demands a cooperative approach towards assessing and managing risk, as it also entails interviews with workers.

This tool will be the “first step” to rapidly but accurately identify the presence of possible sources of risk, even by staff not expert in ergonomics or industrial hygiene.

This objective also reflects the criteria set forth in ISO/TR 12295 with respect to the risk of biomechanical overload.

Against this backdrop, the “problem” of biomechanical overload and WMSDs must be considered together with other occupational “hazards” (be they physical, chemical, biological, occupational stress or other), for the more general purposes of prevention.

MAIN CRITERIA

In accordance with the recommendations of the World Health Organisation (WHO, 2010), three main criteria underpin the methodology:

- **globality**: a global approach towards assessing the worker's discomfort, due to either the task or the workplace,
- **simplicity**: the methodology consists in an easy-to-use model for collecting data,
- **priority-setting**: the results obtained automatically via dedicated software and depicted clearly in bar graphs will not only help to identify problems but also offer a scale of priorities for subsequent interventions and assessments.

The volume also contains many applicative experiences, and an entire chapter is devoted to applications in agriculture.

COURSE CONTENT

INTRODUCTION: AIM AND CRITERIA IN INTERNATIONAL STANDARD: THE TR ISO 12295

KEY ENTERS FOR ALL THE RISKS

QUICK ASSESSMENT FOR BIOMECHANICAL OVERLOAD: UPPER LIMBS REPETITIVE MOVEMENTS- FINAL EVALUATION

QUICK ASSESSMENT FOR BIOMECHANICAL OVERLOAD: MANUAL LIFTING, CARRYING, PUSHING PULLING- FINAL EVALUATION

QUICK ASSESSMENT FOR AWKWARD POSTURES- FINAL EVALUATION

QUICK ASSESSMENT FOR CHEMICAL, PHYSICAL AND BIOLOGICAL POLLUTANTS

ERGOCHECK PLUS: SPECIAL MODEL FOR MULTITASK ANALYSIS

FINAL EVALUATION: PRIORITY DESCRIPTION

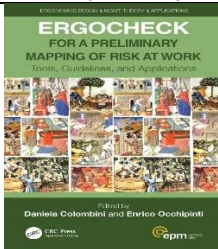
STRESS AND GLOBAL FINAL EVALUATION

RECOMMENDED READING

ERGOCHECK for preliminary mapping of risk at work. Tools, Guidelines, and applications.

Daniela Colombini, Enrico Occhipinti

2020, CRC press, Taylor & Francis



Features

- ERGOCHECK represents the “first step” to rapidly but accurately identify the presence of possible sources of risk, even by staff not expert in ergonomics or industrial hygiene.
- ERGOCHECK is applicable using spreadsheet downloadable for free from the website.
- This objective also reflects the criteria set forth in ISO/TR 12295 with respect to the risk of biomechanical overload.
- -The volume also contains many applicative experiences, and an entire chapter is devoted to applications in agriculture

Summary

The aim here of ERGOCHECK is to suggest a methodology and a comprehensive simple tool for bringing together various potential risk factors to undertake a preliminary mapping of discomfort/danger in the workplaces and to assess consequent priorities for prevention, especially (but not only) in small and very small businesses.

The tool is primarily designed to be used by employers, OSH operators, trade union representatives, but it may also be useful for occupational medical staff conducting periodical inspections and drafting health surveillance protocols, and for supervisory bodies (labour inspectors) conducting inspections in the workplace needing to rapidly detect potentially dangerous situations requiring specific preventive interventions

With the suggested exercises , the course can last 8-12-hours

TACOS STRATEGY

For working posture analysis



MAIN CONTENTS

Most of the methods proposed and currently used for analysing working postures do a fair job of identifying and describing, for single task, which postures should be assessed, and how to score them. What is still missing is a definite procedure for studying working postures in jobs characterized by turnover on many tasks (multitask) that also consider the variation of time exposition (as present in agriculture, constructions, etc..).

To begin with, it must be stressed that in order to study biomechanical overload of the upper limbs as a whole, it is necessary to apply a method that investigates all the associated risk factors rather than focusing only on awkward postures.

The OCRA method (Occhipinti, 1998; Colombini and Occhipinti, 2016), for example, does just that, insofar as awkward postures are in fact one of the risk factors taken into due consideration. In this way this method can predict the % of probability to develop an upper limb Musculo-skeletal disease.

Similarly, the study of biomechanical overload of the lower back during manual handling also requires a multifactorial approach such the one proposed by the RNLE and its extensions (Colombini et al., 2012).

However, the postures of the spine remain to be studied, even in the absence of manual handling of loads, as well as the postures of the lower limbs, to which the TACOs method presented here is mainly dedicated.

MAIN CRITERIA

Basically, this entails reconstructing the task(s) performed by an individual worker or homogeneous group of workers, in terms of the postures adopted during the work.

As mentioned earlier, in our real-world experience, while it is not difficult to single out which postures require evaluating, there are often major shortcomings, regarding:

- the criteria for adjusting final scores based on real task duration (full time, part time, etc..), and
- the criteria for evaluating the exposure to many tasks present in a working cycle where their turnover could be longer than one day (monthly or annual cycle, etc.)

THE AIM OF THE METHOD

The aim of the method proposed here is therefore not to decide which postures should be analysed (extensive use is made of methods and procedures already available in the literature and included in current standards), but rather to suggest how they should be used in relation to time (Timing Assessment) even in more complex situations such as multiple task exposure scenarios and work cycles lasting longer than one day.

The management of all this data and the relevant risk score calculations are so complex that "simple tools", i.e. Excel® spreadsheets [freely downloadable at www.epmresearch.org/free-software-in-english](http://www.epmresearch.org/free-software-in-english) have been developed for gathering, managing and processing the data.

COURSE CONTENT

THE MAIN METHODS OF STUDYING POSTURES

ISO AND CEN TECHNICAL STANDARDS

METHODS, EVALUATION CRITERIA AND CRITICAL ISSUES. RULA, REBA, OWAS, OREG, SUVA, QEC

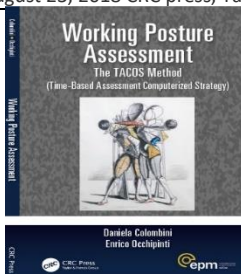
EXERCISES IN THE USE OF THE RULA METHOD

LUNCH

Working Posture Assessment: The TACOS (Time-Based Assessment Computerized Strategy) Method

Daniela Colombini, Enrico Occhipinti

-August 23, 2018 CRC press, Taylor & Francis



Features

Provides a coherent definition of what the study of awkward postures is:

Clarifies and explains which parameters need to be detected and analysed for the study of the working postures.

Defines the phases of a proper organizational study (e.g., tasks, postures, duration, and how often the postures will last) in the working cycle.

Presents a new and original risk calculation model for awkward postures, with particular attention to the study of the spine and the lower limbs.

Offers a free excel spreadsheet located on the authors' website which implements the strategy for calculating risk associated with exposure to awkward postures.

Summary

This book covers how to analyse awkward working postures, particularly of the spine and lower limbs, in specific groups exposed. The methods covered suggests how to evaluate the postures correctly, taking account of the duration and sequence of the tasks involved, even in very complex scenarios where workers are involved with multiple tasks and work cycles varying from day to day. Excel spreadsheets located on the authors' website (www.epmresearch.org) have been developed to gather, condense, and automatically process the data. The tools serve to implement the strategy for calculating risk associated with exposure to awkward postures. The TACOS method. Included are 5 case studies which include physiotherapists, workers from construction, archaeological digs, vineyards, and kindergarten teacher.

With the suggested exercises , the course can last 12-16 hours



ERGOCHECK specific

for civil construction and agriculture courses
Techniques and tools for pre-mapping of occupational risks

Edited by Daniela Colombini

Here I will present TWO SPECIFIC simple model "ERGOCHECK" adapted to prevention of musculoskeletal diseases BOTH in the construction sector AND IN AGRICULTURE, in order to improve the health and safety of workers, also in application of the criteria present in two TR iso,

In the course we will present , through many examples the ERGOCHECK worksheet, with these two versions specifically designed for the BUILDING INDUSTRY and AGRICULTURE.

We will spend time to teach how to study the work organisation, underlining the important of the first chapter, dealing with the organizational data, which is perhaps one of the most difficult aspects in these two fields.

Let me repeat that to simplify this organizational study, we have tried to create TWO SPECIFIC PRE-DEFINED LISTS OF POSSIBLE TASKS (the tasks library).

The list might not be exhaustive, we are still in the early stages of this research.

Let's not forget that in the automatic assessment what's important, what's been difficult, but what we have tried to do, is :

TO CONSIDER EACH RISK FACTOR BASED ON ITS REAL DURATION THROUGHOUT THE YEAR.

This is what's new with respect to the classic ERGOCHECK: we can now use it in multi-task situations with annual cycles, and adjust the final rating of risk priorities, with respect to the actual duration of each task.

Course contents

00. PROJECT PRESENTATION

0.ERGOCHECKcostruMULTITASK

INTRODUCTION

1.GENERAL STRUCTURE BOTH FOR COSTRUCTION AND AGRICULTURE

Presentation of the **GENERAL MODEL OF THE SPECIAL ERGOCHECK** valid for Construction and Agriculture both

2.A costruINTRO E ORG

2.B costruAUTOMATIC TIME AND RISKS

3.costruKEY ENTER ALL RISKS

4.costru REPETITIVE MOVEMENTS

5.costru MANUAL HANDLING

6.costru POSTURE

7.costru POLLUTANTS BIOLOGIC

8.costru STRESS

9.costru FINAL RESULTS and CONCLUSION

10.costru EXAMPLES

New model : **ERGOCHECKcostru**
Specific for civil constructions
this model includes a "pre-evaluated library of work tasks (subdivided into macro-phases and phases) present in civil constructions.

11.A agri ORG and ALL RISK

11.B agri REPETITIVE MOVEMENTS

11.C agri MANUAL HANDLING POSTURE

11.D agri POLLUTANT STRESS FINAL

11.E agri FINAL and EXAMPLES

New model : **ERGOCHECKagri**
Specific for agriculture
this model includes a "pre-evaluated library of work tasks (subdivided into macro-phases and phases) present in civil constructions.