



Dieter Jacob/Clemens Müller (Eds.)

Estimating in Heavy Construction

Roads, Bridges, Tunnels, Foundations

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Estimating in Heavy Construction Roads, Bridges, Tunnels, Foundations

Dieter Jacob
Clemens Müller
(Eds.)

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Foreword

There is no up-to-date English language textbook on heavy construction calculation/estimation, in contrast to building construction. This may be because this type of construction often involves heavy construction machinery from Germany and Asian countries. Therefore, I appreciate that such a textbook for contractors as well as clients has been provided.

This book can be used for US heavy construction, as well as heavy construction in Asia and developing countries. The examples are calculated in euros and can easily be changed into USD. The examples have to be adapted to the local/regional conditions with regard to wages and material costs. The sales tax/value added tax as used also needs to be adapted.

The book provides a good basis for estimation because all important cost categories are considered. The risks of different construction contracts are systematically evaluated with regard to risk distribution between owner and contractor. Specific risks, for instance for joint ventures, are also considered. A systematic scheme for the calculation of interim interest is provided as well.

The book differentiates between time-dependent and time-independent costs. This allows one to easily calculate the costs caused by delays. The initial strategy part of the book considers the effect of different levels of capacity utilization and the cost/profit consequences. The calculation/estimation is not presented as a deterministic process, but the book shows how this depends on strategic considerations, subjective factors and stochastic characteristics. The book also demonstrates the application of cost estimating software.

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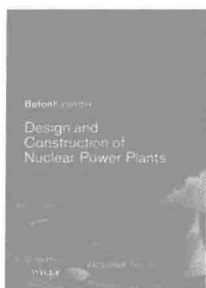
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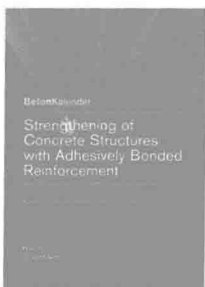
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Preface

In contrast to building construction, there are only a few available English books on estimating in heavy construction projects, such as roads, bridges and specialized foundation engineering works for buildings. This book is based on our German estimating book, in which we have collected German examples. These real projects can also be applied to the international market.

The estimating is based on specific construction methods which are dependent on the boundary conditions, the machinery available and the quality and training of personnel.

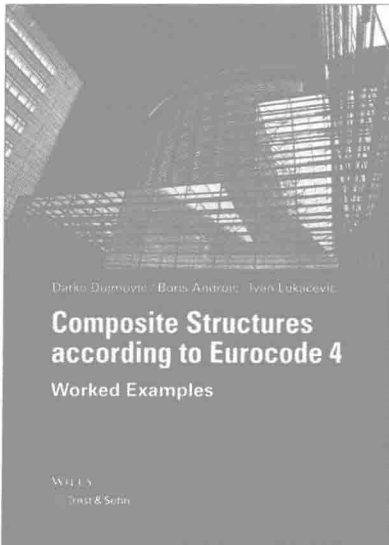
Be aware that estimating is always a stochastic process and cannot deliver a deterministic result. Reliable estimating is not only important for a contractor but also for a professional client who wants to have a rough overview of his cost situation, especially in civil engineering and underground construction. This is expensive, complicated work and one cannot simply measure square or cubic meters of living space as in standardized building engineering. One only has to think of related significant cost overruns in a few recent large-scale projects to understand the need for a publication written exclusively for heavy construction estimating.

We would especially like to thank all contributing heavy contractors such as Strabag Großprojekte GmbH, VINCI, Heijmans Oevermann GmbH, BAUER AG and Matthäi Bauunternehmen GmbH & Co. KG for their support.

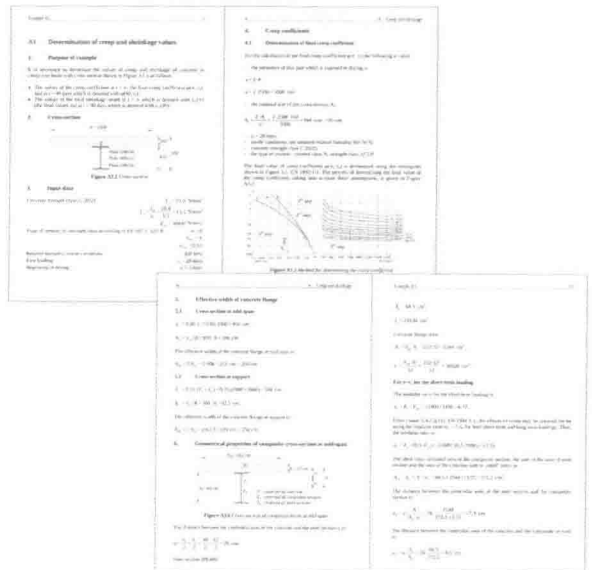
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List of Abbreviations

acc.	according
approx.	approximately
av.	average
AW	average wage
BIM	Building Information Modelling
BOT	build, operate, transfer
BR	boring rate
C	concrete
CA	compressed air
CAD	computer-aided design
calc.	calculation
CAPM	capital asset pricing model
Cf.	compare
contr	contractor
Dia.	diameter
div.	division
dist.	distance
DW	diaphragm wall
ea.	each
EDP	electronic data processing
e. g.	exempli gratia – for example
Empl.	employee
ER	employer
GMP	guaranteed maximum price
HPI	high-pressure injection
hol.	holiday
i. e.	id est – in other words
ID	Identity
IDC	indirect costs
ISO	International Organization for Standardization
ins.	insurance
JV	joint venture
LOC	letter of credit
MT	microtunnel
OCC	overhead construction costs

OP	order procurement
P	performance
PC	prime Costs
pos.	position
PPP	public-private partnership
proc.	procurement
pub.	published
QM	quality management
qty.	quantity
QU	quantity unit
RAP	risk and profit
resp.	respectively
RMS	risk management system
RN	record number
str.	strength
SUB	subcontractor
TBM	tunnel boring machine
tot.	total
TP	total price
TS	tunnel segment
UoM	unit of measurement
UP	unit price
VaN	value as new
VAR	value at risk
VAT	value added tax (sales tax)
WG	wage group
w/o	without

Selected terms to help international understanding

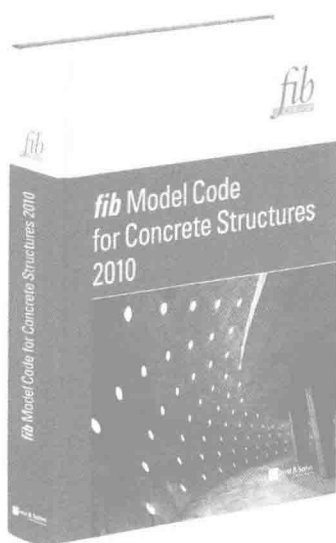
A	motorway
AG	incorporated company
B	federal highway
BAL	construction site equipment list
BGB	German Civil Code
BSt	rebar steel
DIN	German Institute for Standardization
e.V.	registered association

ERA	UCP: Uniform Customs and Practise for Documentary Credits
FGSV	Construction of the Road and Transportation Research Association
GmbH	Limited (Ltd.)
KonTrag	Control and Transparency for Areas in Business Act
RQ	standard cross section
RStO	Guidelines for the standardization of the superstructure
VOB	Public Construction Tendering and Contract Regulations

Units

a	anno
CD	calender days
cm	centimeter
CW	calender weeks
d	day
EUR	euro
g	gram
h	hour
KEUR	thousand euros
km	kilometer
kW	kilowatt
kWh	kilowatt hour
l	liter
m	meter
min.	minute
mm	millimeter
mo	month
pc	piece
Q	quarter
RM	running meter
t	tons
WD	working days
w/c	water / cement ratio

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The *fib* Model Code 2010 was produced during the last ten years through an exceptional effort by Joost Walraven (Convener; Delft University of Technology, The Netherlands), Agnieszka Bigaj-van Vliet (Technical Secretary; TNO Built Environment and Geosciences, The Netherlands) as well as experts out of 44 countries from five continents.



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