Interreg Alpine Space project - **NEWFOR**

Project number 2-3-2-FR

NEW technologies for a better mountain **FOR**est timber mobilization

Priority axis 2 - Accessibility and Connectivity

Workpackage: Costs and benefits – WP 7

English Glossary for Estimating the Costs of Cable Crane Operations with "HeProMo", the Wood Harvesting Productivity Model from WSL

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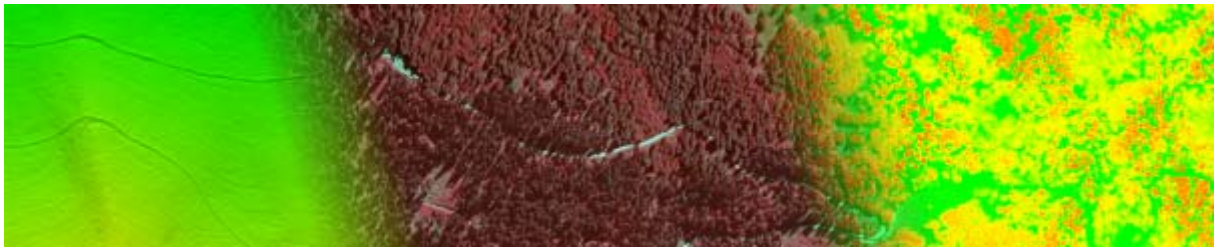
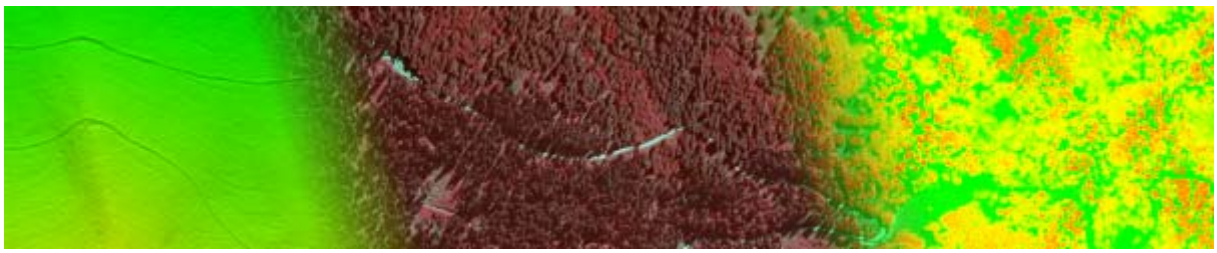


The consortium of the project Interreg Alpine Space NEWFOR

This project has been, co-funded by the European Regional Development Funds, and achieved under the third call of the European Territorial Cooperation Alpine Space Programme 2007-2013.



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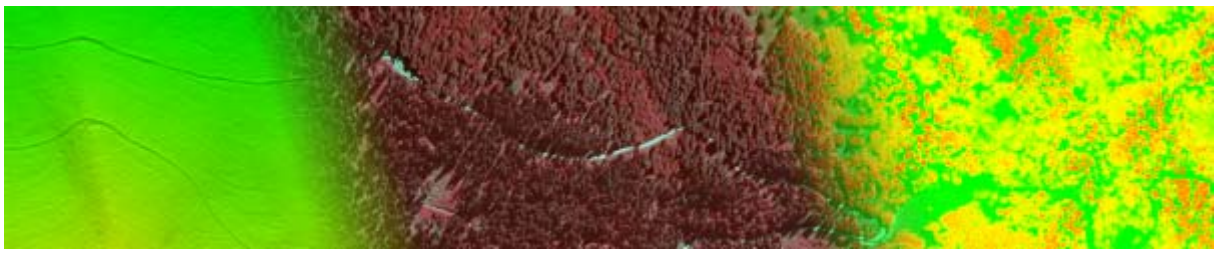
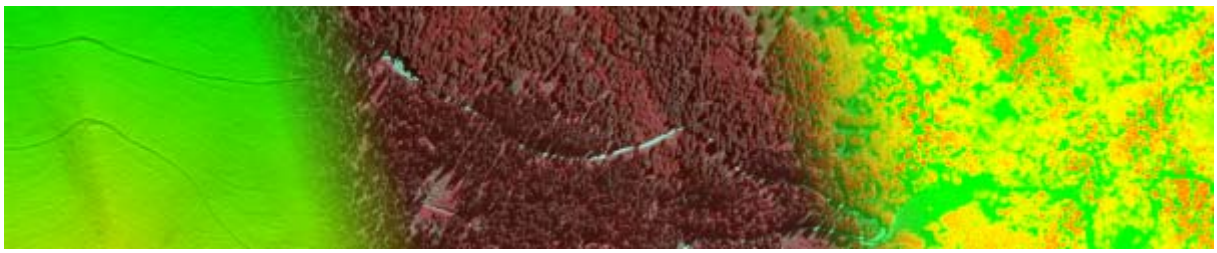


1 ABSTRACT

With the “HeProMo” computer model the time and cost for the motor manual harvesting can be calculated. It is possible to calculate the time and the cost of each timber shock. The control of the software was given only in German language. For international user, a translation in the form of an English Glossary was made.



2 A SYNTHETIC OVERVIEW OF THE INTERREG ALPINE SPACE PROJECT NEWFOR

2.1 THE CONTEXT

Although forests represent a key resource of mountain environments, their valorization is hampered by accessibility constraints that prevent an efficient mapping, management, harvesting and transport of wood products.

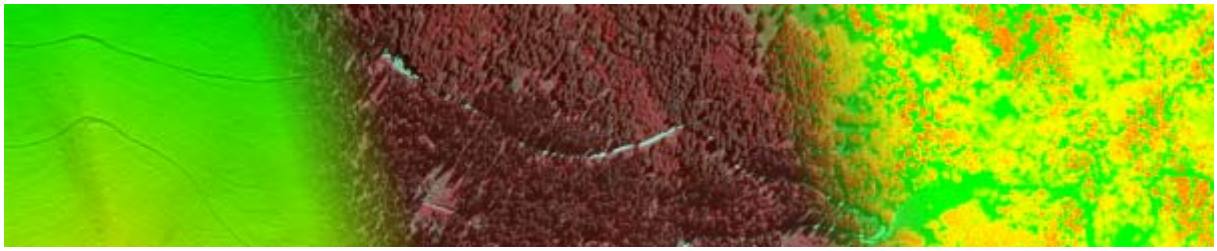
Forests fulfil multiple functions in mountainous areas. They have an ecological function as host of many habitats and species. They also are a leisure area for social activities such as hiking, skiing… From the economical perspective, the production of renewable resources like timber and fuelwood has positive effects both at global scale, with climate change mitigation, and local scale with rural employment and the development of a regional value chain. The objective of preserving and improving the development of mountain forests is a point of public interest. However, managing forests in mountain territories is a difficult task as topography and climate set strong constraints inside a complex socio-economical framework.

In particular, a precise mapping of forest biomass characteristics and mobilization conditions (harvesting and accessibility) is a prerequisite for the implementation of an efficient supply chain for the wood industry. The available information is currently insufficient to provide, at reasonable costs, the required guarantees on the wood supply and on its sustainability. With the recent development of new remote sensing technologies and modelling tools, major improvements regarding the evaluation of the forest growing stock and accessibility are now possible. Upon this highly valuable information, decision-making tools must be build to optimize the investments in forest infrastructures required for a cost-effective wood supply while securing the sustainable management of forests, and to support the implementation of an efficient European policy for mountain forest management.

2.2 OBJECTIVES OF THE PROJECT

According to this context and based on the use of new technologies (LiDAR: light detection and ranging, Unmanned Aerial Vehicle,...) for forest and topography characterization, the project NEWFOR is dedicated to enhance and develop tools and adapted policies for decision making in the field of a sustainable and adaptive mountain forest resources management facing the sustainability of mountain forest ecosystems services.

So, the main objective of the NEWFOR project is the improvement of mountain forest accessibility for a better economical efficiency of wood harvesting and transport in a context of sustainable forest management and wood industry in changing climate.



The 14 partners involved in the project consortium tackle this objective within five thematic workpackages (wp):

- Forest resources and LiDAR

Recent developments in LiDAR technology, combined to other available data sources (aerial photographs, aerial photo series by UAVs, …), are now allowing a precise and fine mountain forest resource quantification, qualification and mapping. Integrating this technology will provide an innovative response to the challenges of a precise and robust knowledge on the available growing stocks. The project aims at testing and developing tools that will help forestry end-users to benefit from this technological advance.

- Forest accessibility

After the identification of forest resources, the second step of an efficient forest management is to evaluate the accessibility to these resources. In mountain areas, topography is the main constraint to a technical and economically efficient exploitation. The project demonstrated how to use topographic LiDAR data coupled with geographic information systems (GIS) for an optimal planning of forest harvesting and logging while taking current and scheduled accessibility of forest resources into account.

- Forest and industry connectivity

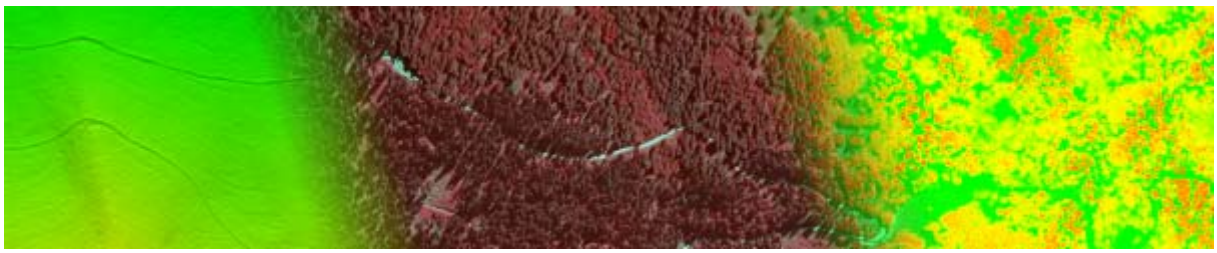
Once the forest resources and accessibility are characterized, then remains the issue of the connectivity between wood piles in the forests and wood yard of mills. This link is often neglected but is crucial for a comprehensive assessment of the wood supply efficiency.

- Costs and benefits evaluation

NEWFOR aims at developing decision-making tools dedicated to the definition of strategies for sustainable mountain wood supply chain. To fulfil this objective, tools for identifying forest resources, their accessibility and connectivity to the wood market are first considered separately. In order to achieve the demarche, and to choose the optimal strategy, it is necessary to evaluate the whole workflow from the economical aspect by comparing the costs and benefits of each possible strategy.

- Logistical planning strategy

There is a need to frequently adjust the planning of forest management to new economical evidence as well as to unforeseeable developments. Such an adaptive management needs to balance ecological, social and economic factors. The final objective was to provide forest managers and decision makers with reliable information for the evaluation of technical and economical conditions for their decision-making on timber supply chain logistical planning and land use strategies.



3 WP 7 - COSTS AND BENEFITS EVALUATION

3.1 HEPROMO – HARVESTING PRODUCTIVITY MODEL

3.1.1 GENERAL DESCRIPTION -USABILITY OF THE TOOL

The timber harvesting productivity model “HeProMo” is used to calculate the need of time and costs of different harvesting operations. The modular construction allows both the calculation of individual works or entire work chains.

"HeProMo" is a computerized internet based model for the calculation of the time and cost of the main timber harvesting operations and individual harvesting chains. It is aimed at forestry companies, loggers, forestry administrations and training institutes as well as developers of software for forestry applications.

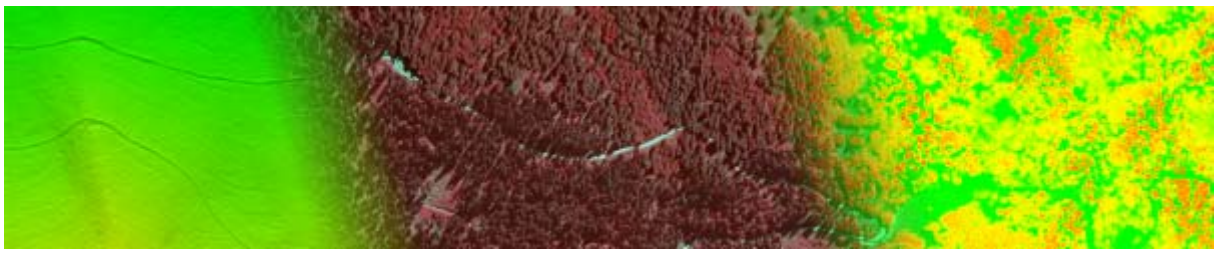
With "HeProMo" pre-calculations could be performed and variants could be tested.
For this reason it is also suitable for the derivation of standard local fees, e.g. as a basis for forest services agreements.

"HeProMo" helps entrepreneurs to create quotes and allows forest companies and forest owners to check entrepreneur offers critical.

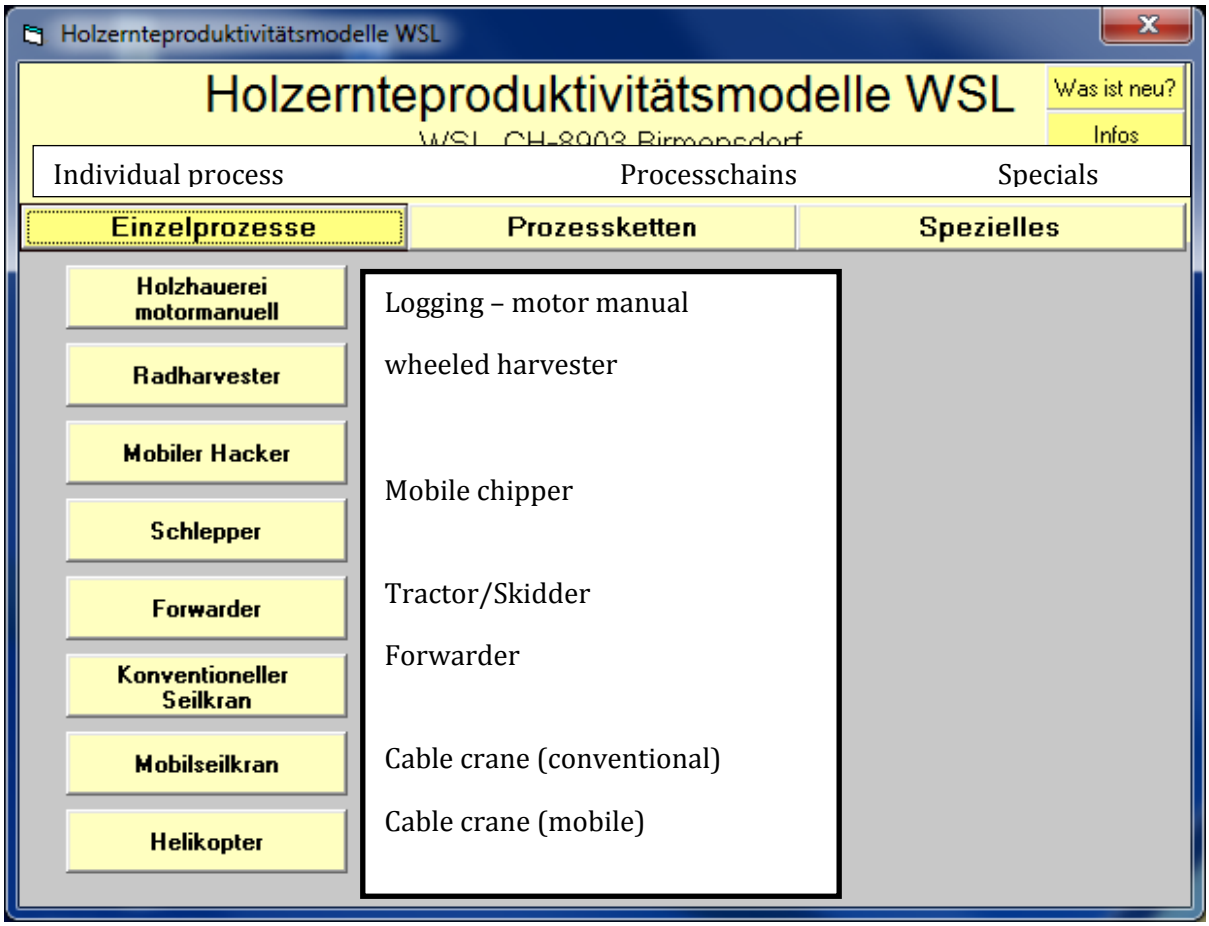
By means of sensitivity analysis, it is possible to estimate the influence of individual input variables on the outcome.

"HeProMo" is also ideal for education and training and for use in schools and courses.
With its modules, it also supports the re-use in other applications such as simulation models and information systems.

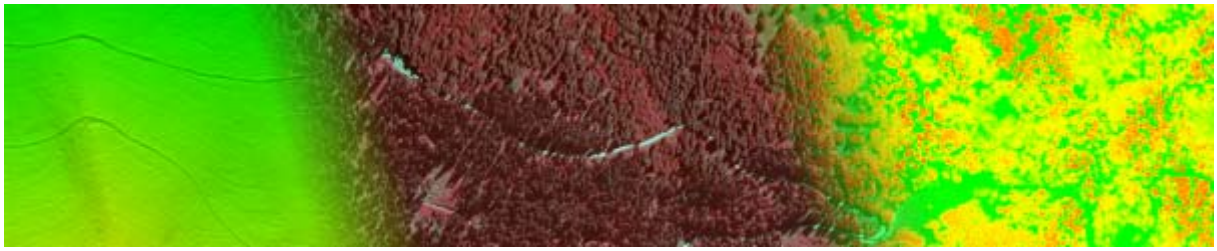
"HeProMo" was developed as part of the WSL research program "Management of sustainable forest management" and is a Windows software (up from Win 95) with user-friendly menu navigation. Available to the model are a ReadMe file with information on installation and use, so as also comprehensive documentation and user help for the individual models of "HeProMo".

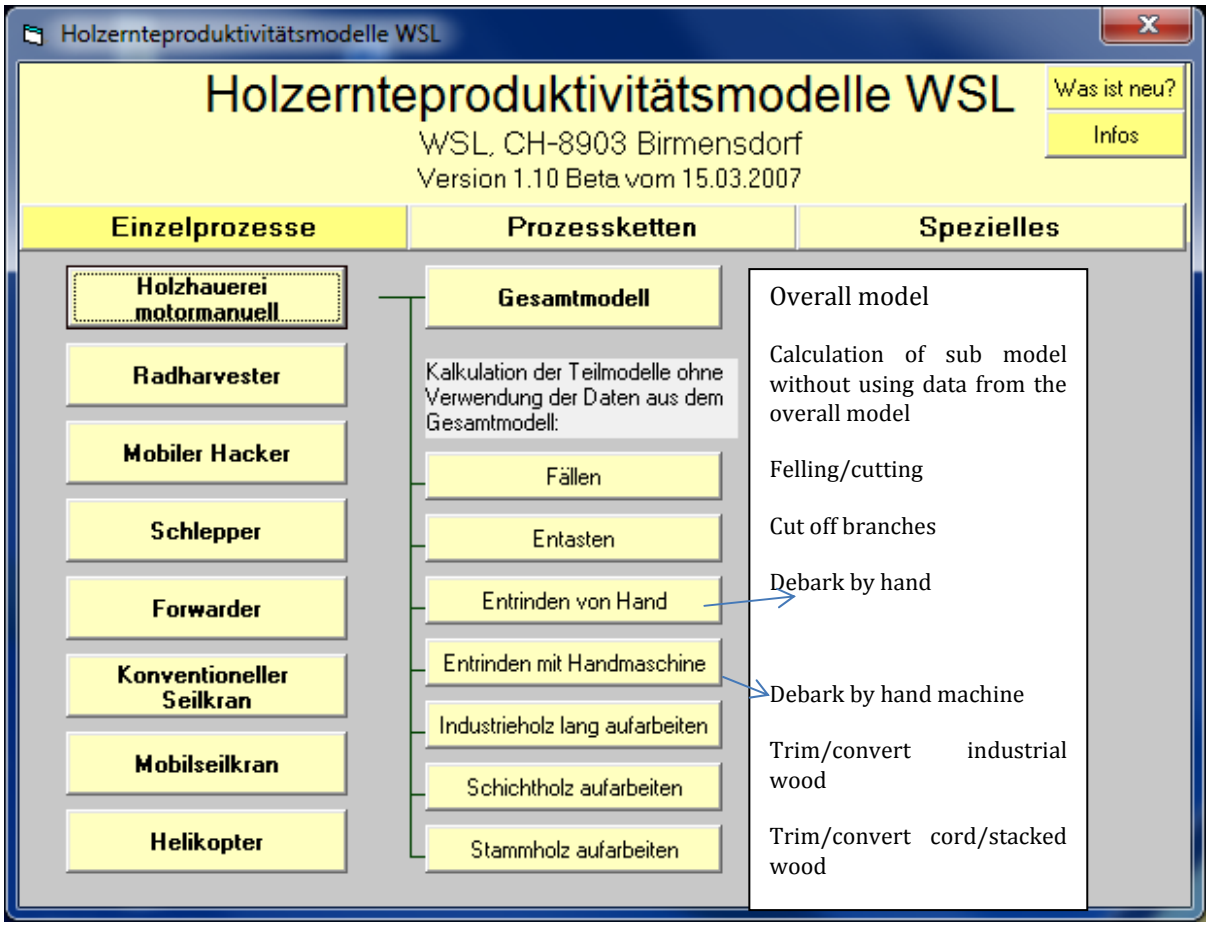


3.1.1.1 ENGLISH GLOSSARY FOR "HEPROMO"

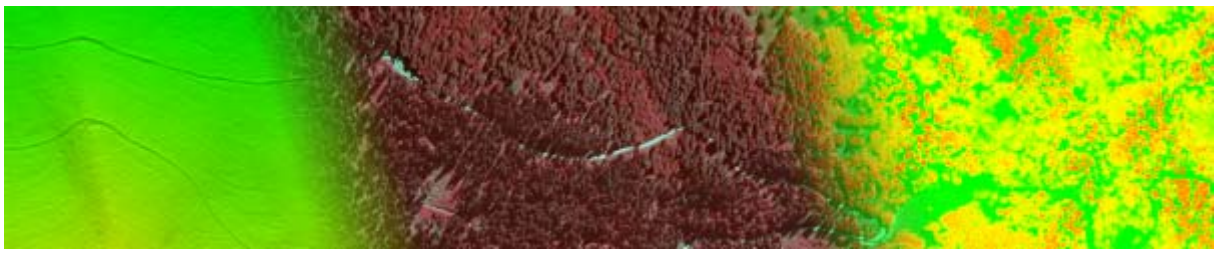


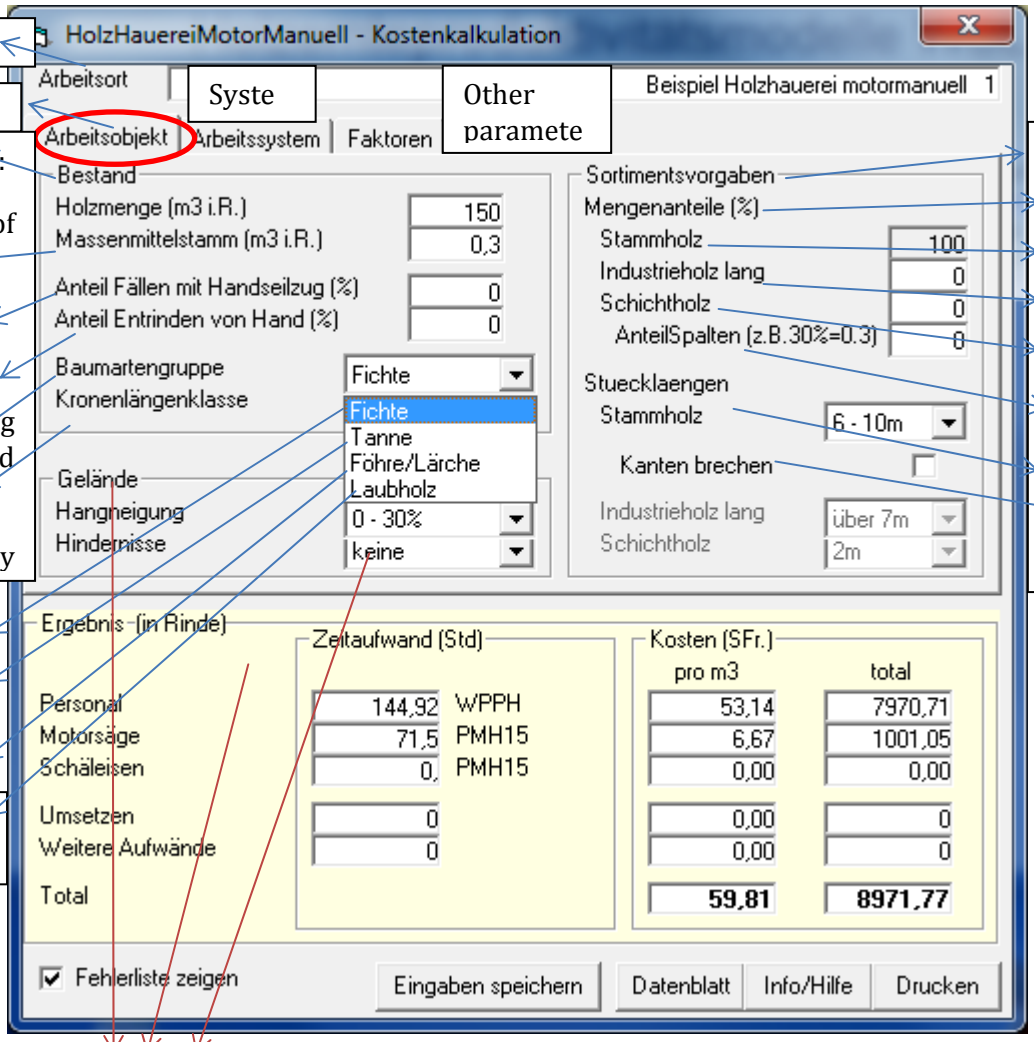
Now Press „Holzhauerei motormanuell"





Now Press „Gesamtmodell“





Location

Work

Foreststand:

Amount of wood

Average stem

% of felling with hand cable

% debark by

spruce

fir

Pine/larc

hardwood

Syste

Other paramete

Assortment criteria:

Amount %

Stemwood

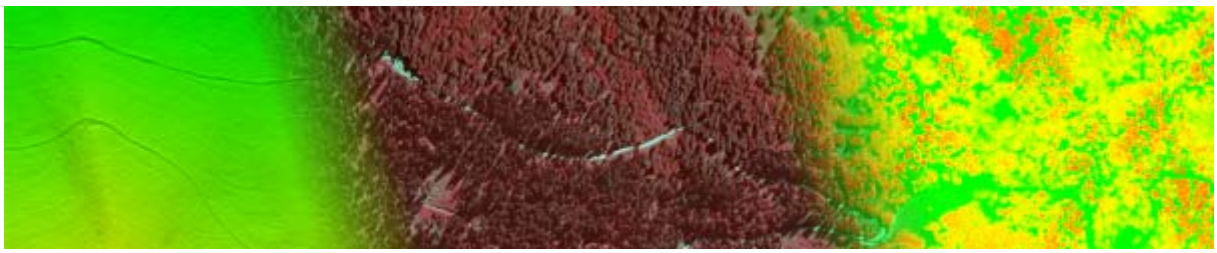
Industrial wood

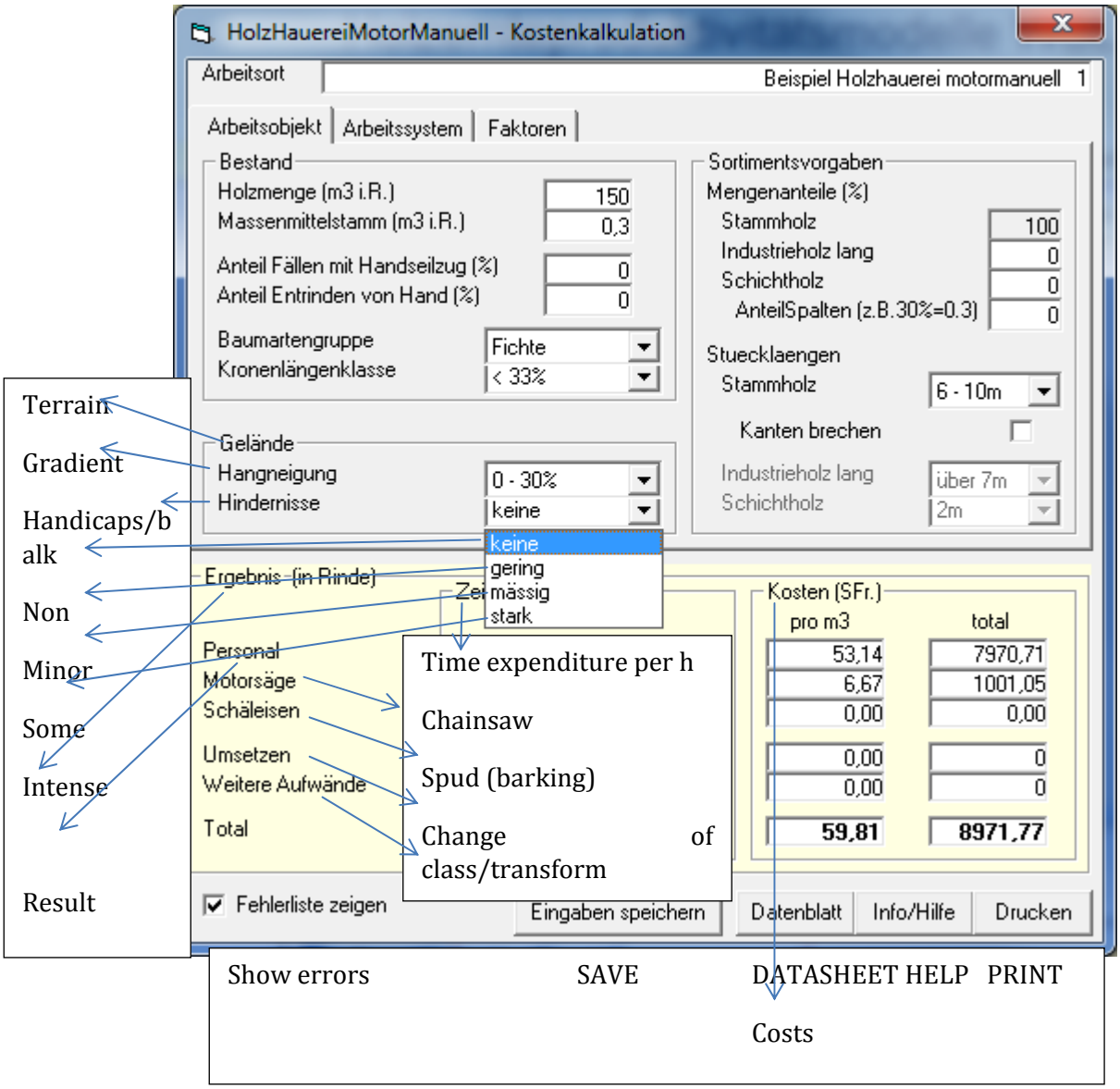
cord/stacked wood

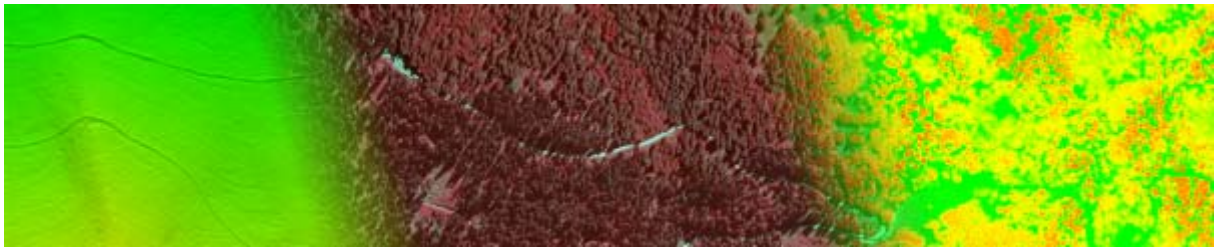
share in % split wood

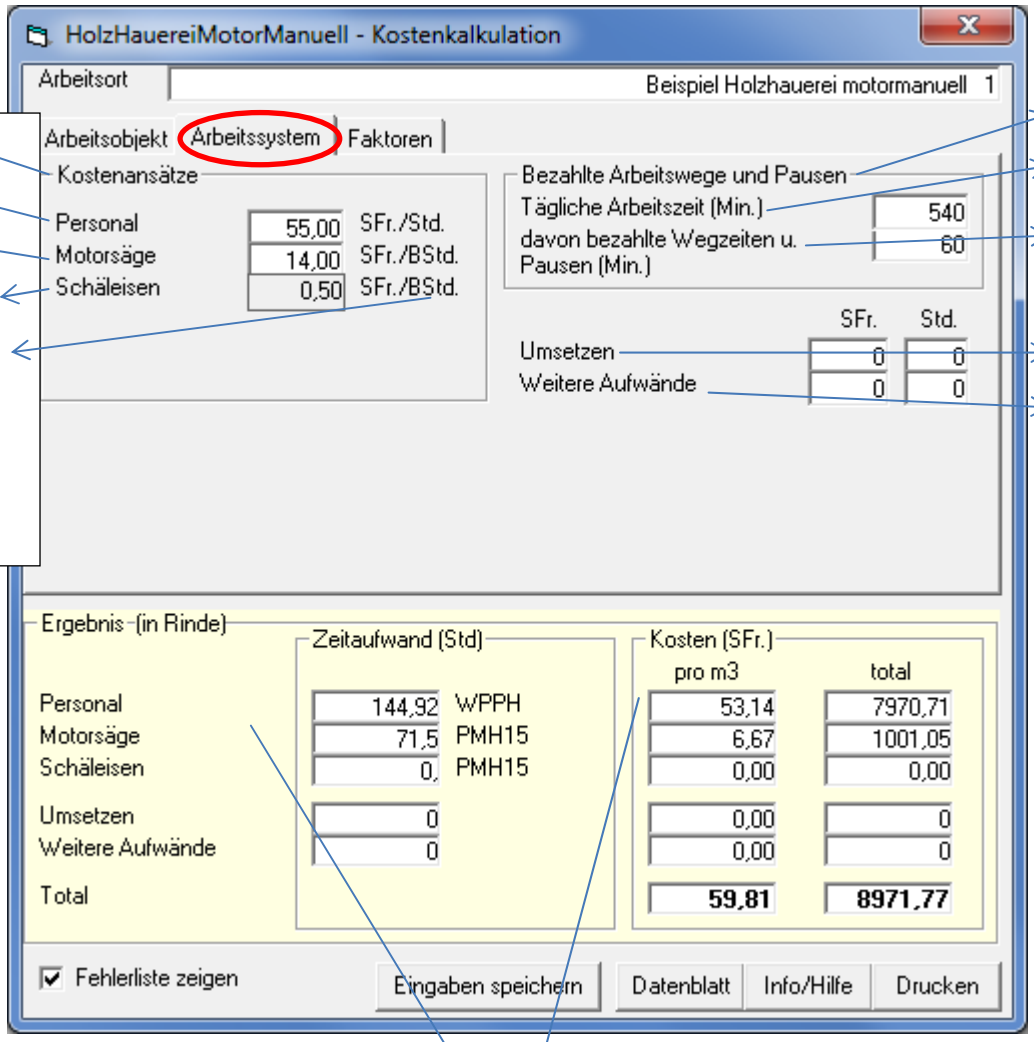
Lenght per piece

See next page




HolzHauereiMotorManuell - Kostenkalkulation
Arbeitsort
Beispiel Holzhauerei motormanuell 1
Arbeitsobjekt
Arbeitssystem
Faktoren
Bestand
Holzmenge (m3 i.R.)
150
Massenmittelstamm (m3 i.R.)
0,3
Anteil Fällen mit Handseilzug (%)
0
Anteil Entrinden von Hand (%)
0
Baumartengruppe
Fichte
Kronenlängenklasse
< 33%
Sortimentsvorgaben
Mengenanteile (%)
Stammholz
100
Industrieholz lang
0
Schichtholz
0
AnteilSpalten (z.B.30%=0.3)
0
Stuecklaengen
Stammholz
6 - 10m
Kanten brechen
Industrieholz lang
über 7m
Schichtholz
2m
Gelände
Hangneigung
0 - 30%
Hindernisse
keine
keine
gering
mässig
stark
Ergebnis (in Rinde)
Kosten (SFr.)
pro m3
total
Personal
53,14
7970,71
Motorsäge
6,67
1001,05
Schäleisen
0,00
0,00
Umsetzen
0,00
0
Weitere Aufwände
0,00
0
Total
59,81
8971,77
Fehlerliste zeigen
Eingaben speichern
Datenblatt
Info/Hilfe
Drucken
Terrain
Gradient
Handicaps/balk
Non
Minor
Some
Intense
Result
Time expenditure per h
Chainsaw
Spud (barking)
Change of class/transform
Show errors
SAVE
DATASHEET HELP
PRINT
Costs





Costs:

Personnel

Chainsaw

Spud (barking)

Operating hour

Paid duty stroke/Break

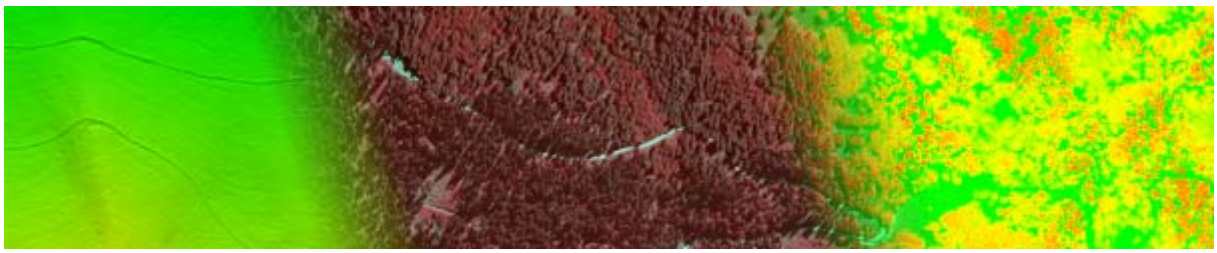
Daily hours of work

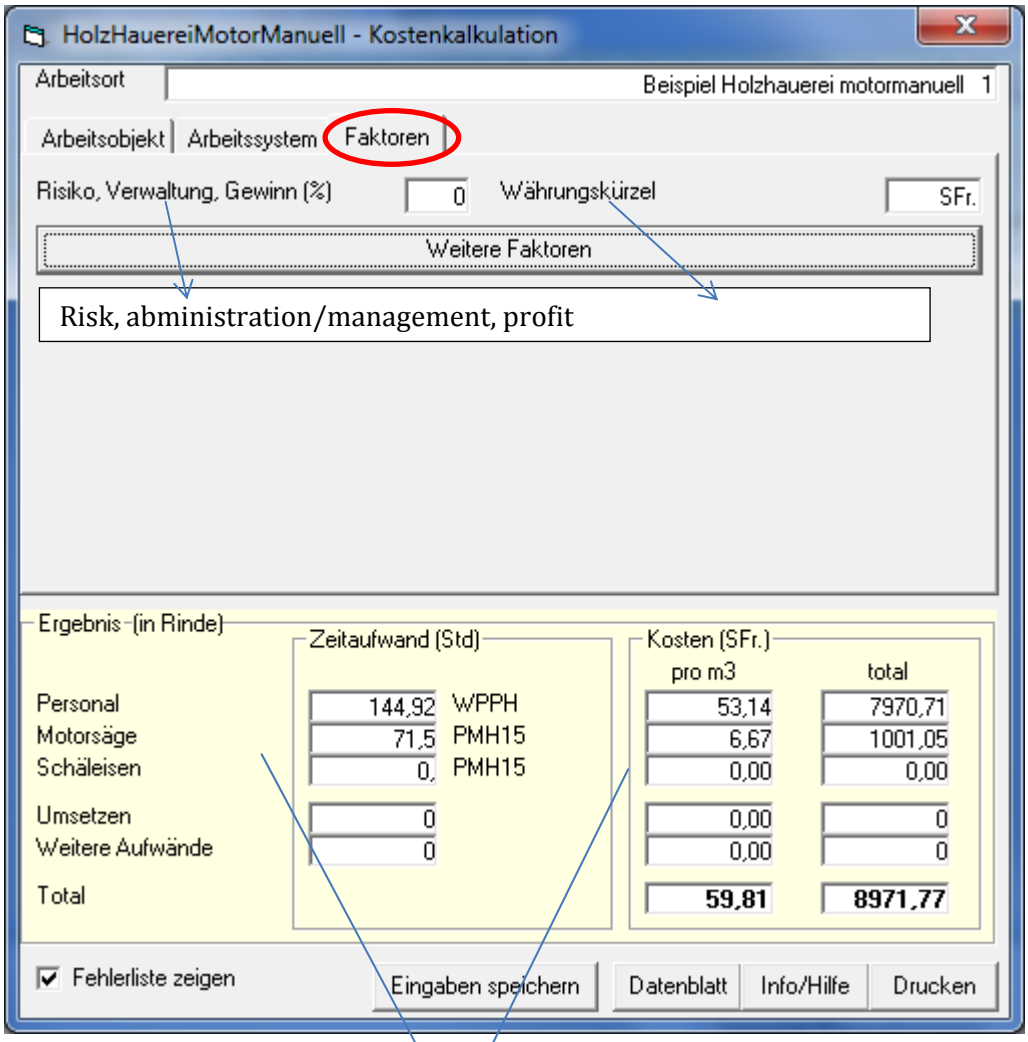
Of which Paid duty stroke/Break

Change of class/transform

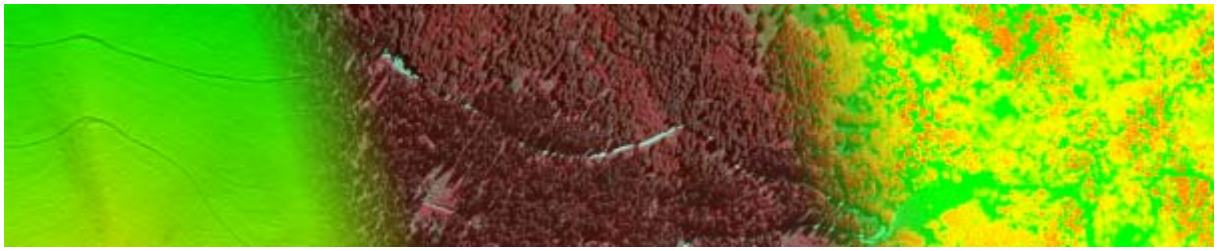
Others

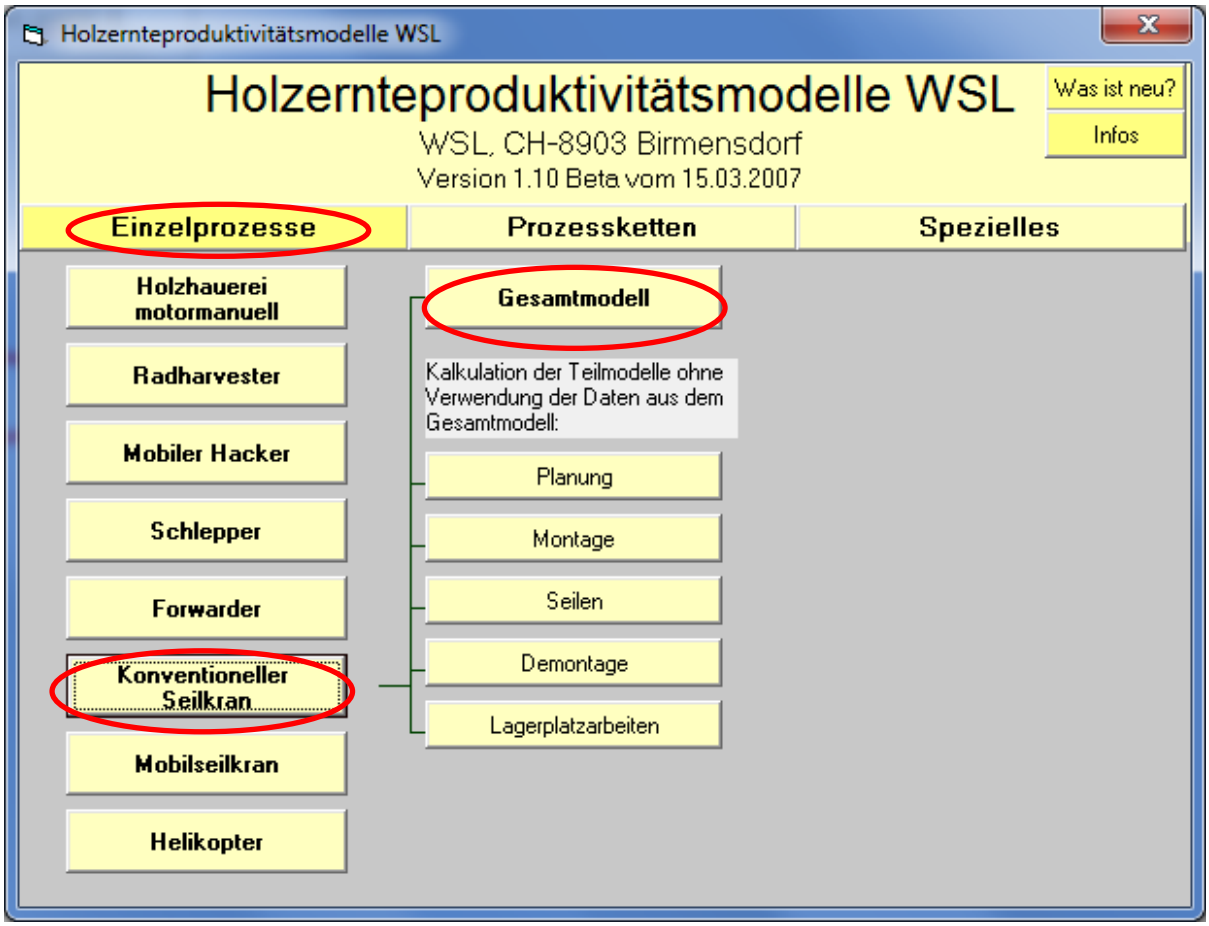
See page 11

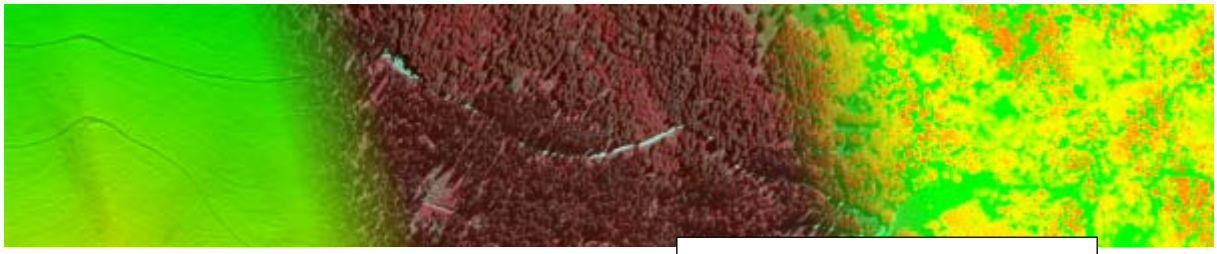


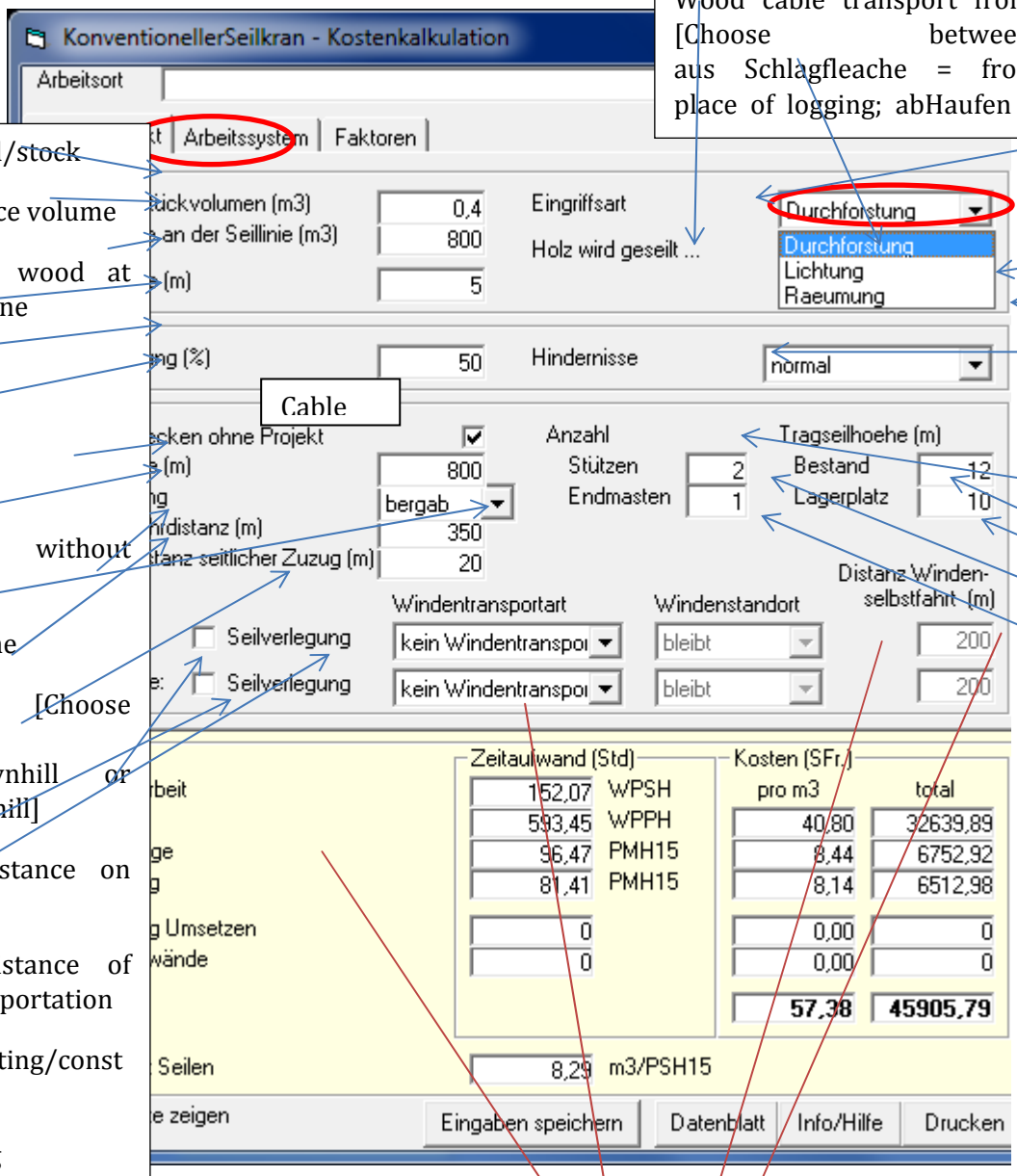

HolzHauereiMotorManuell - Kostenkalkulation
Arbeitsort
Beispiel Holzhauerei motormanuell 1
Arbeitsobjekt
Arbeitssystem
Faktoren
Risiko, Verwaltung, Gewinn (%)
0
Währungskürzel
SFr.
Weitere Faktoren
Risk, abministration/management, profit
Ergebnis (in Rinde)
Zeitaufwand (Std)
Kosten (SFr.)
pro m3
total
Personal
144,92 WPPH
53,14
7970,71
Motorsäge
71,5 PMH15
6,67
1001,05
Schäleisen
0, PMH15
0,00
0,00
Umsetzen
0
0,00
0
Weitere Aufwände
0
0,00
0
Total
59,81
8971,77
Fehlerliste zeigen
Eingaben speichern
Datenblatt
Info/Hilfe
Drucken

See page 11




Holzernteproduktivitätsmodelle WSL
Holzernteproduktivitätsmodelle WSL
WSL, CH-8903 Birmensdorf
Version 1.10 Beta vom 15.03.2007
Was ist neu?
Infos
Einzelprozesse
Prozessketten
Spezielles
Holzhauerei motormanuell
Radharvester
Mobiler Hacker
Schlepper
Forwarder
Konventioneller Seilkran
Mobilseilkran
Helikopter
Gesamtmodell
Kalkulation der Teilmodelle ohne Verwendung der Daten aus dem Gesamtmodell:
Planung
Montage
Seilen
Demontage
Lagerplatzarbeiten





Wood cable transport from: [Choose between: aus Schlagfleache = from place of logging; abHaufen =

Forest stand/stock

Average piece volume

Amount of wood at each cable line

Piece length

Terrain

Gradient

Mark line without project

Length of line

Direction [Choose between: bergab=downhill or bergauf=uphill]

Average distance on the skyline

Average distance of lateral transportation

Montage/fitting/construction

Demounting

Chage of line (if checked see next page for choices)

Choose type of operation:

Thinning

Clearance

Final-/Regeneration

Handicaps/balk [choose between: Normal, erschwert=hindered; and extreme]

Amount

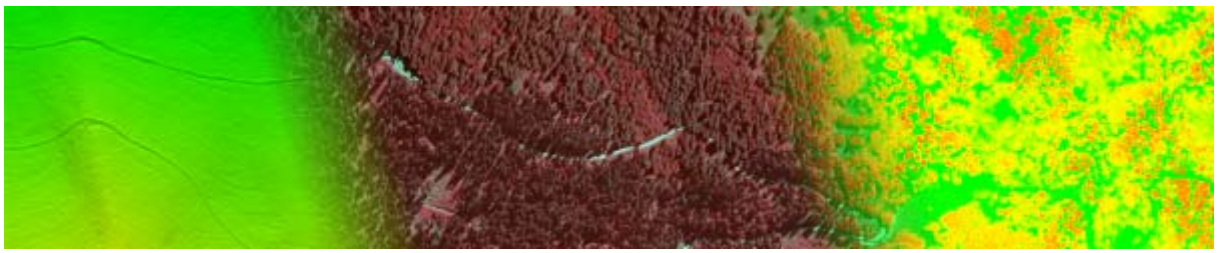
Height of skyline

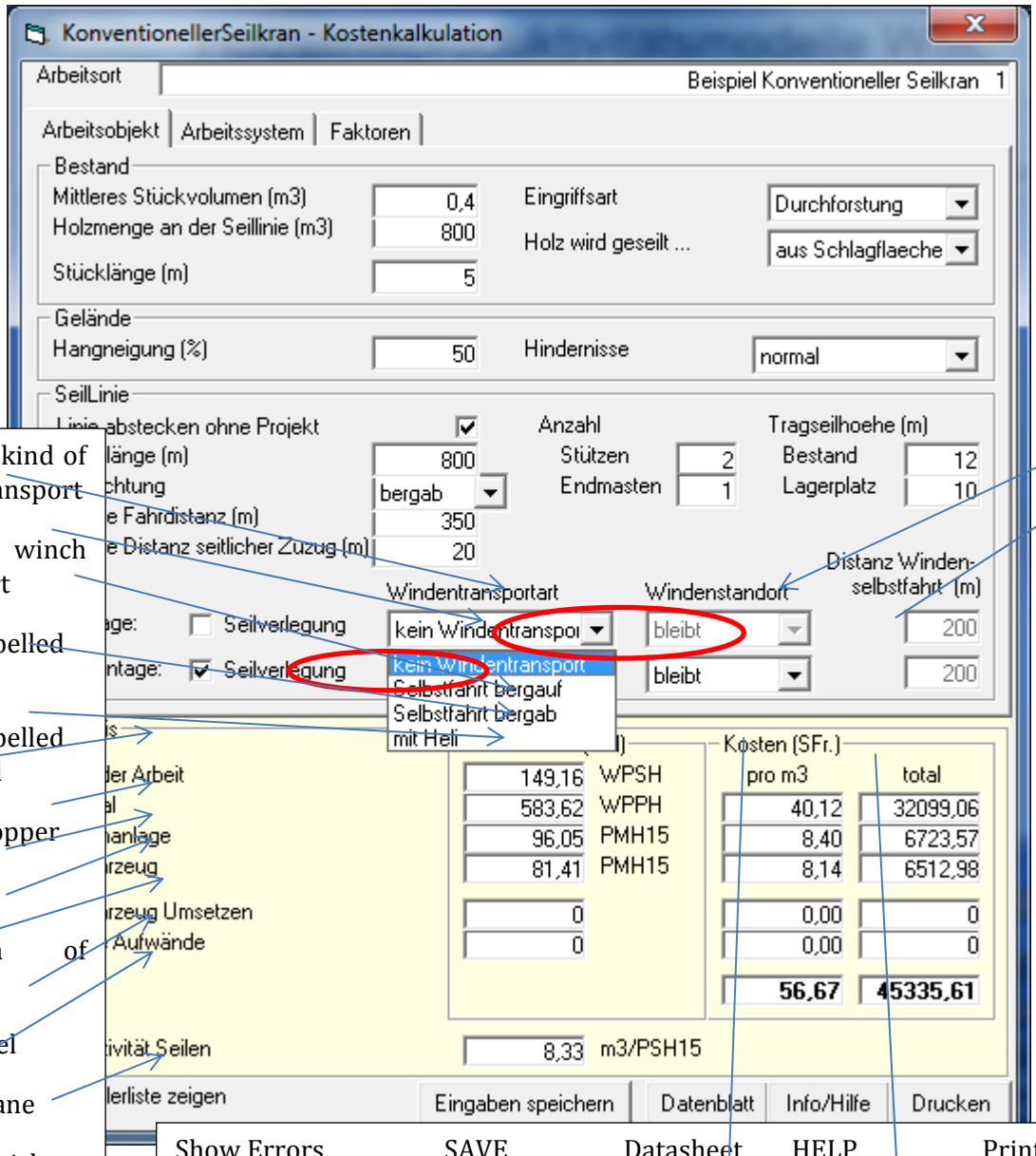
Stock/stand

Depot/camp

Intermediate

See nextpage!





Choose kind of winchtransport

No winch transport

Self-propelled uphill

Self-propelled downhill

With chopper

Results

Duration of Work

Personnel

Cable crane

Cranevehicle

Move Cranevehicle

Other expenditures

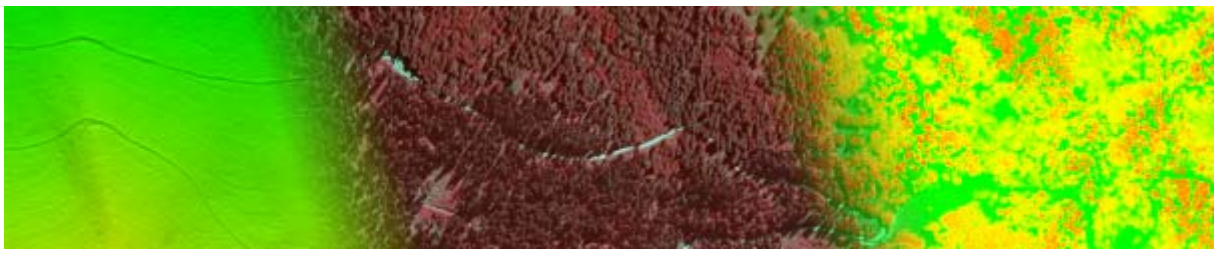
Productivity

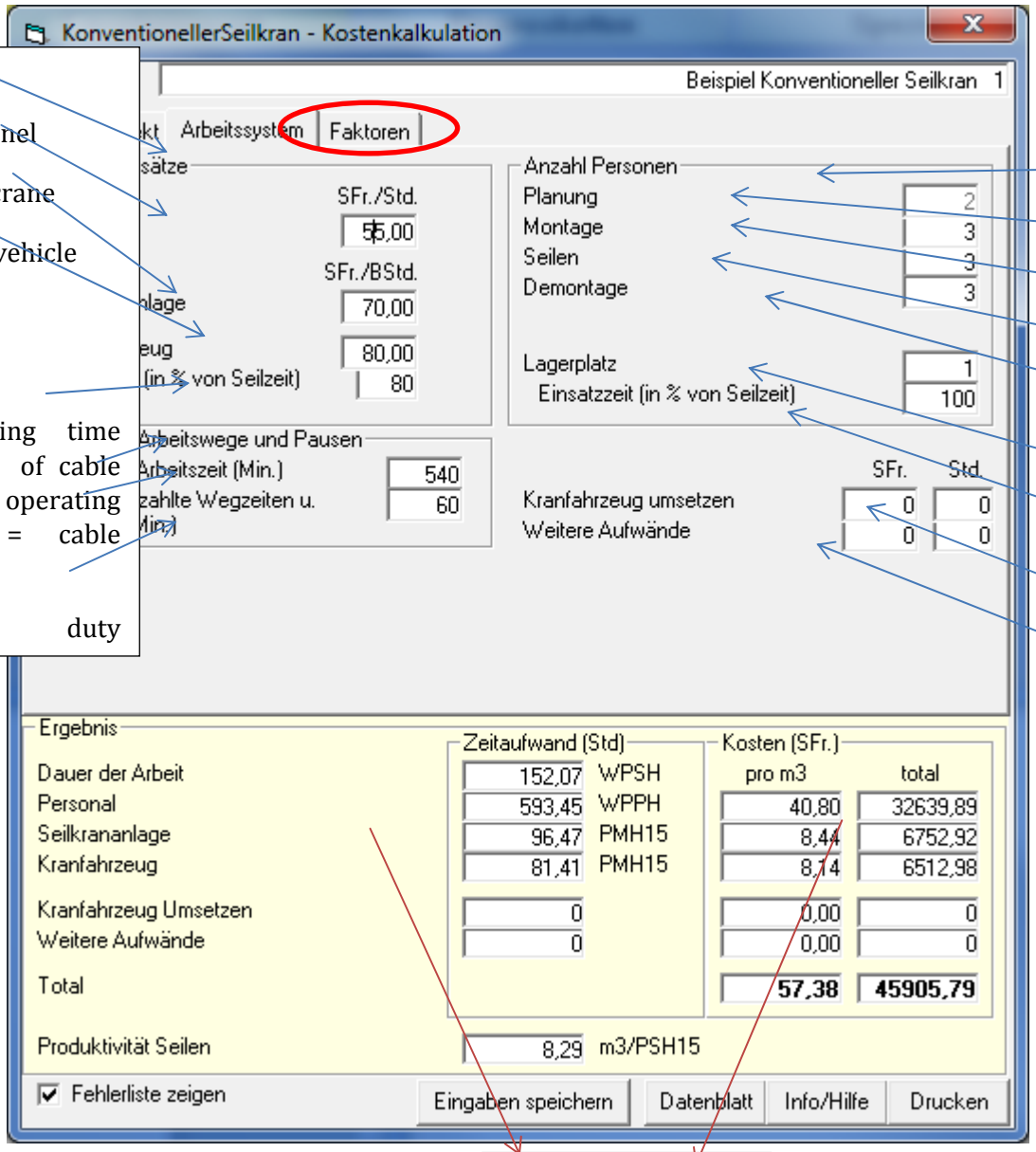
Location of winch: Choose between: [bleibt=stays at location; wechselt=changes]

Distance of self-propelled winchtransport

Show Errors SAVE Datasheet HELP Print

Time expenditure per h Costs





Costs

Personnel

Cable crane

Crane vehicle

Operating time (in % of cable crane operating time = cable time)

Paid duty

Number of Personnel

Planning

Mounuting/Construction

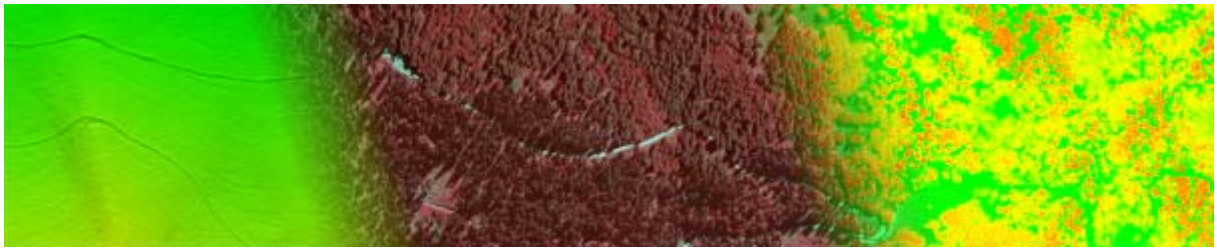
Slide logs by means of ropes

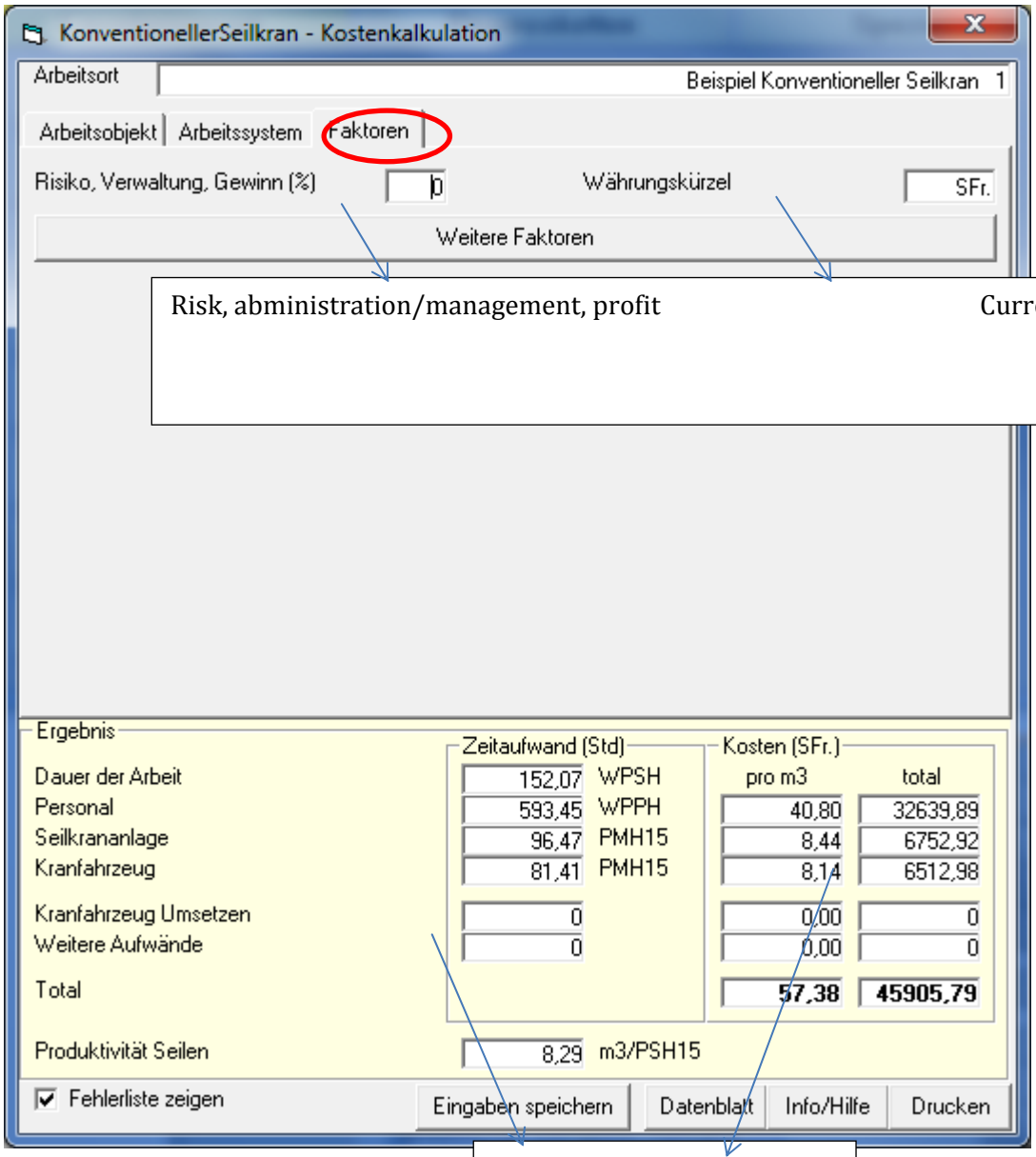
Demounting

Depot/Camp

Operating Time(in %

See Page 9

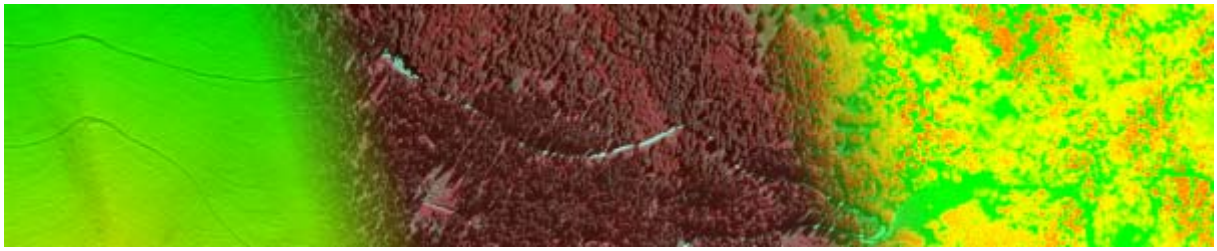


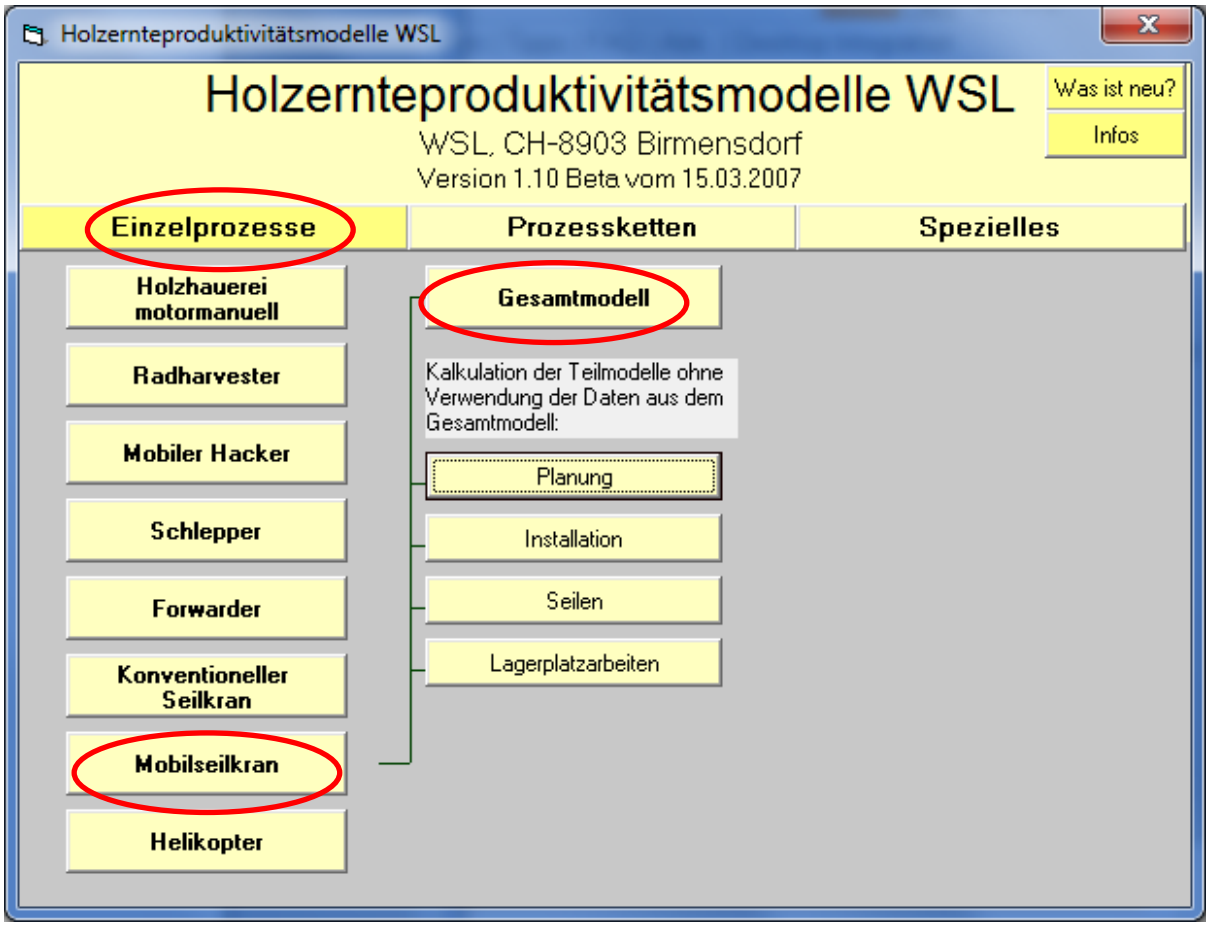


Risk, abministration/management, profit

Currency

See page 9




Holzernteproduktivitätsmodelle WSL
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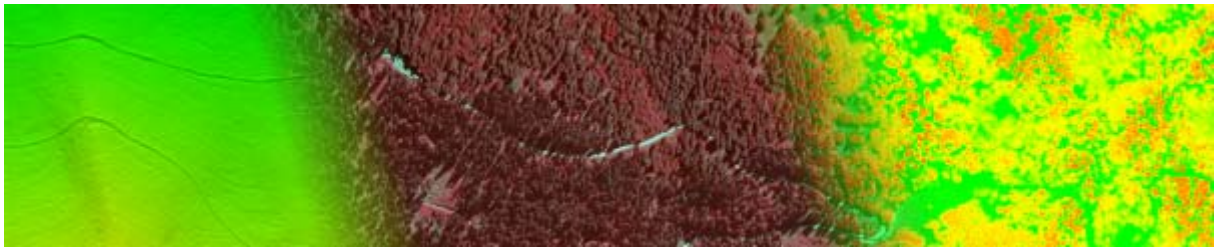
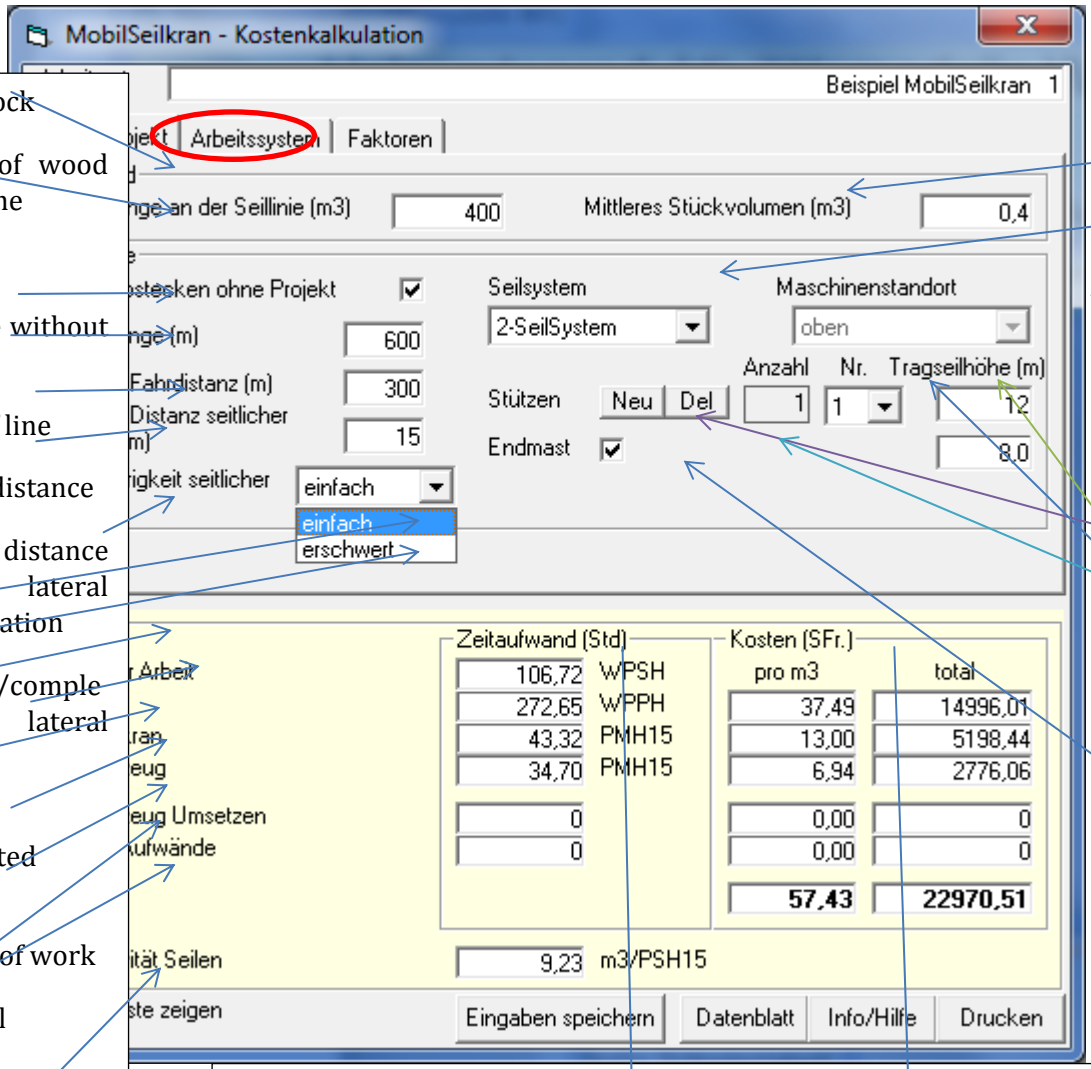
Installation
Seilen
Lagerplatzarbeiten





Stand/Stock

Amount of wood atcable line

Mark line without project

Length of line

Average distance

Average distance of lateral transportation

Difficulty/complexity of lateral transport

Easy
Complicated

Results
Duration of work

Personnel

Cable crane mobile/portable

Crane vehicle

Average piecevolume

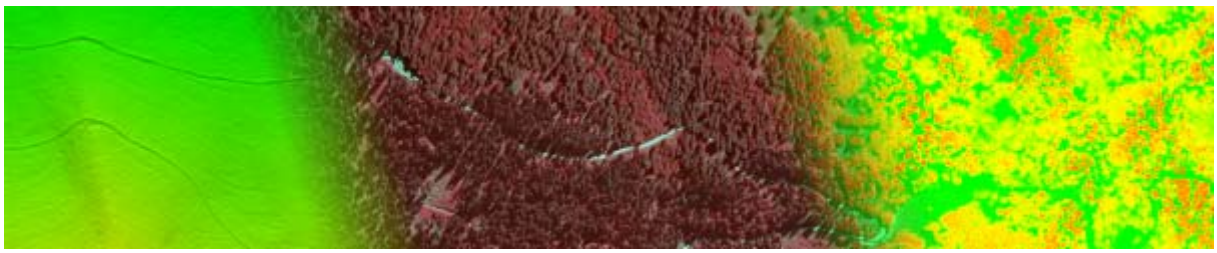
Cable system [choose between: 2-Seil System=2 cable system; Mehrseil System= Multiple cable system]

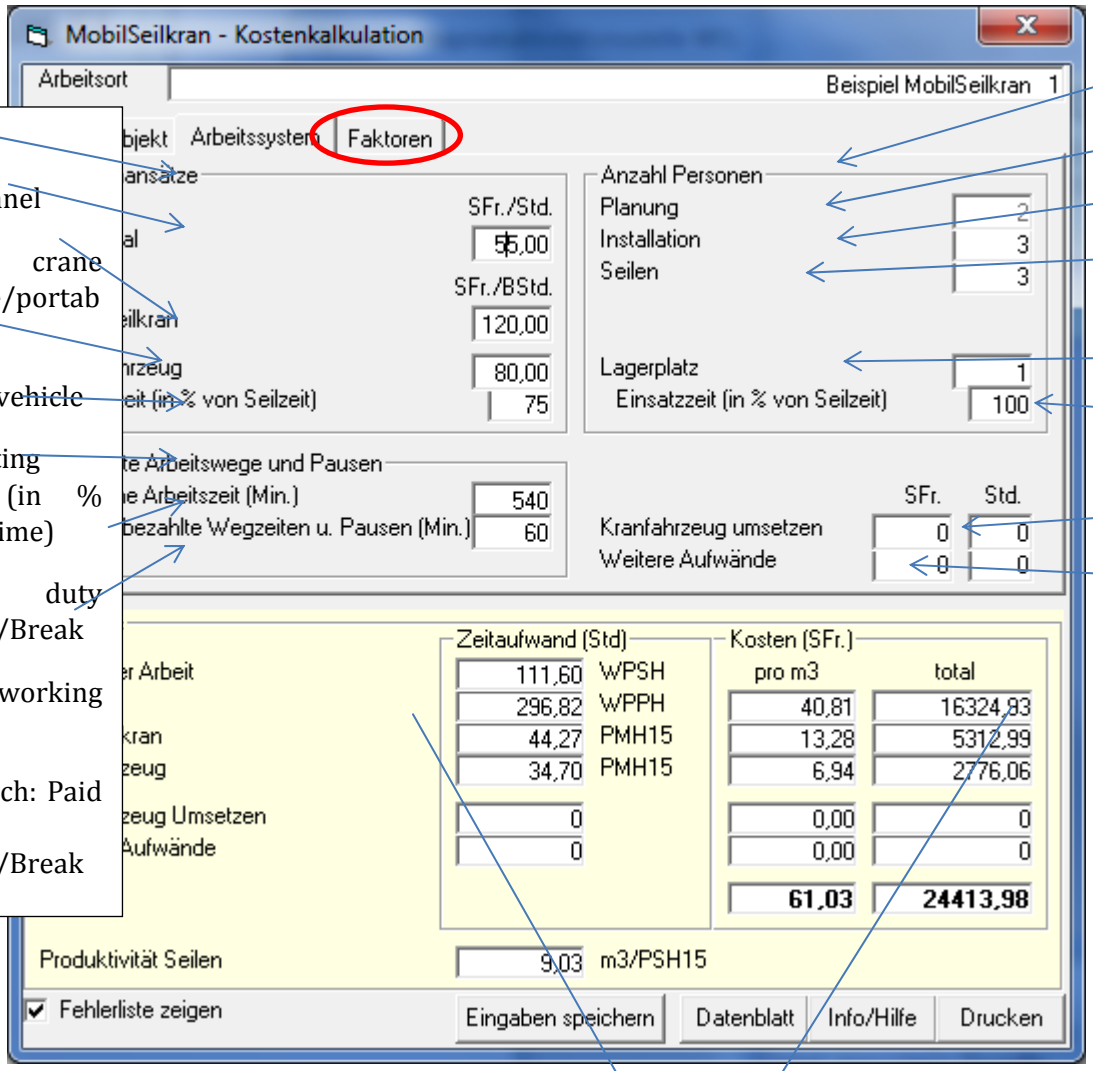
Location of Machine[choose between: unten=on the bottom; oben=on the top

Intermediate Pole/Pillar

Show Errors SAVE DATASHEET HELP PRINT

Time expenditure per h Costs





Costs

Personnel

Cable crane mobile/portable

Crane vehicle

Operating time (in % cable time)

Paid duty stroke/Break

Daily working hours

Of which: Paid duty stroke/Break

Number of Personnel

Planning

Mounuting/Construction

Slide logs by means of ropes

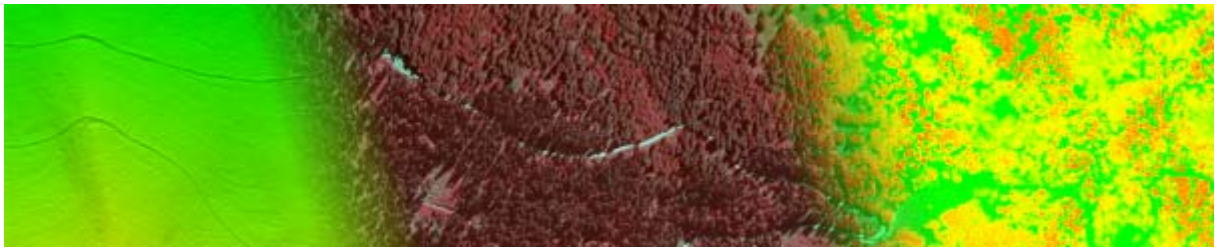
Depot/Camp

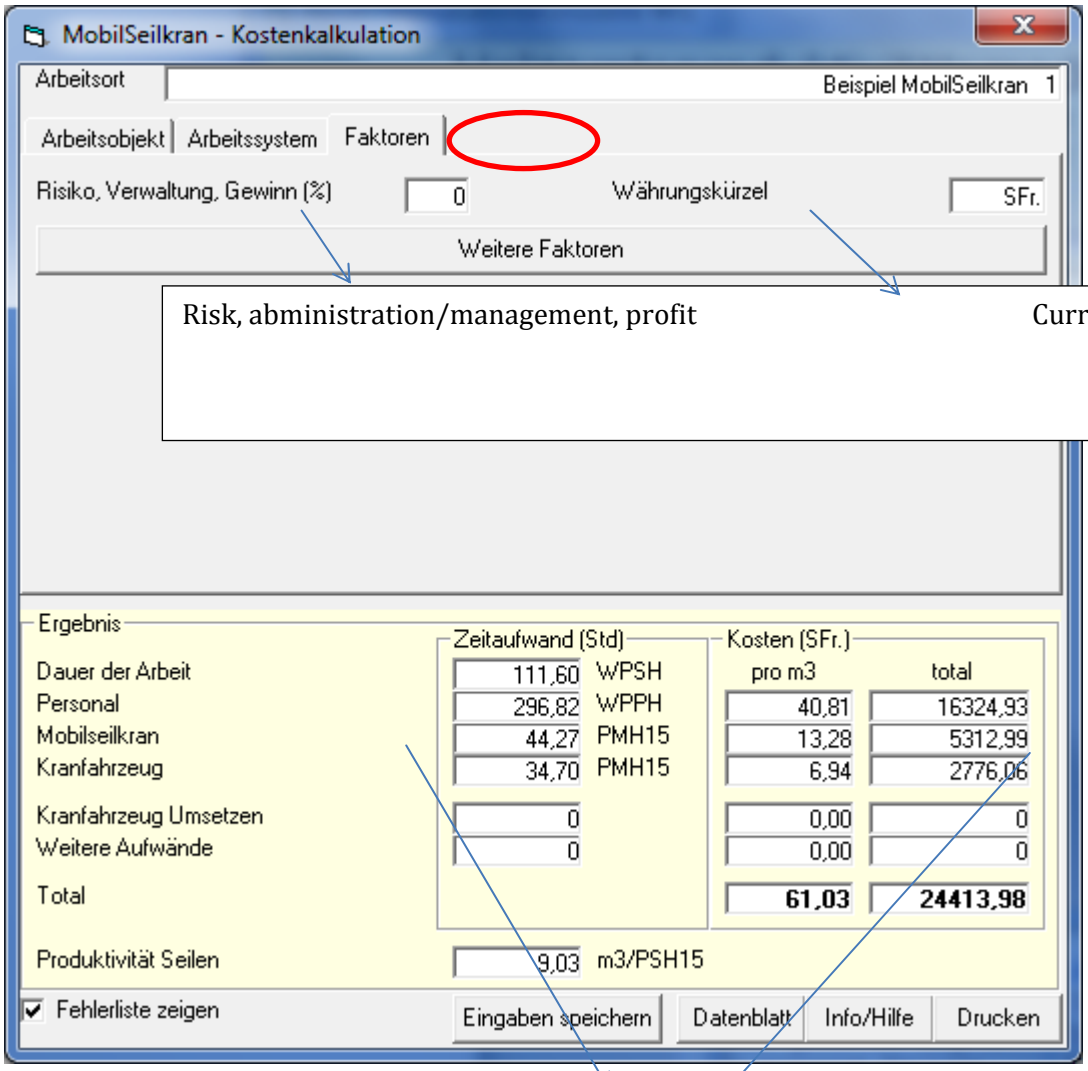
Operating Time(in % of cable time)

Move Crane vehicle

Other expenditu

See page 20

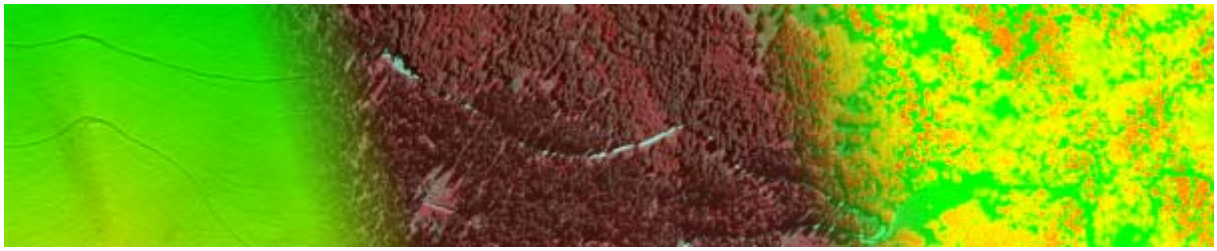


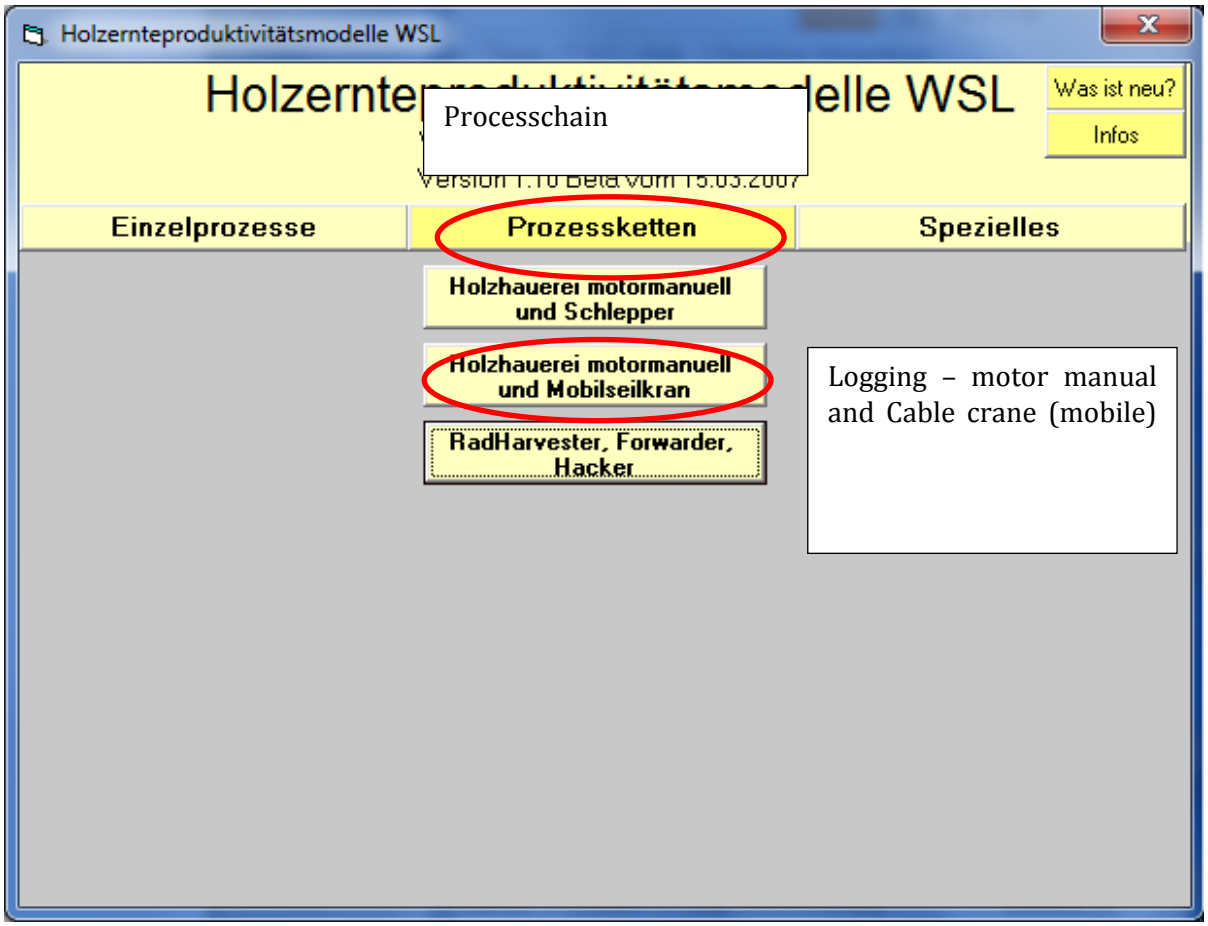


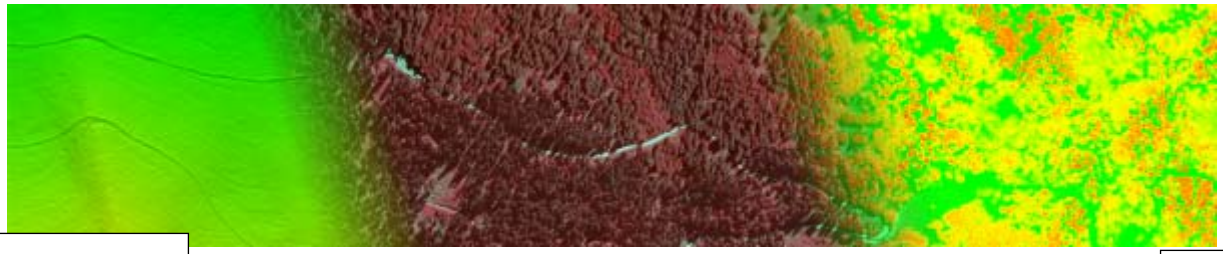
Risk, abministration/management, profit

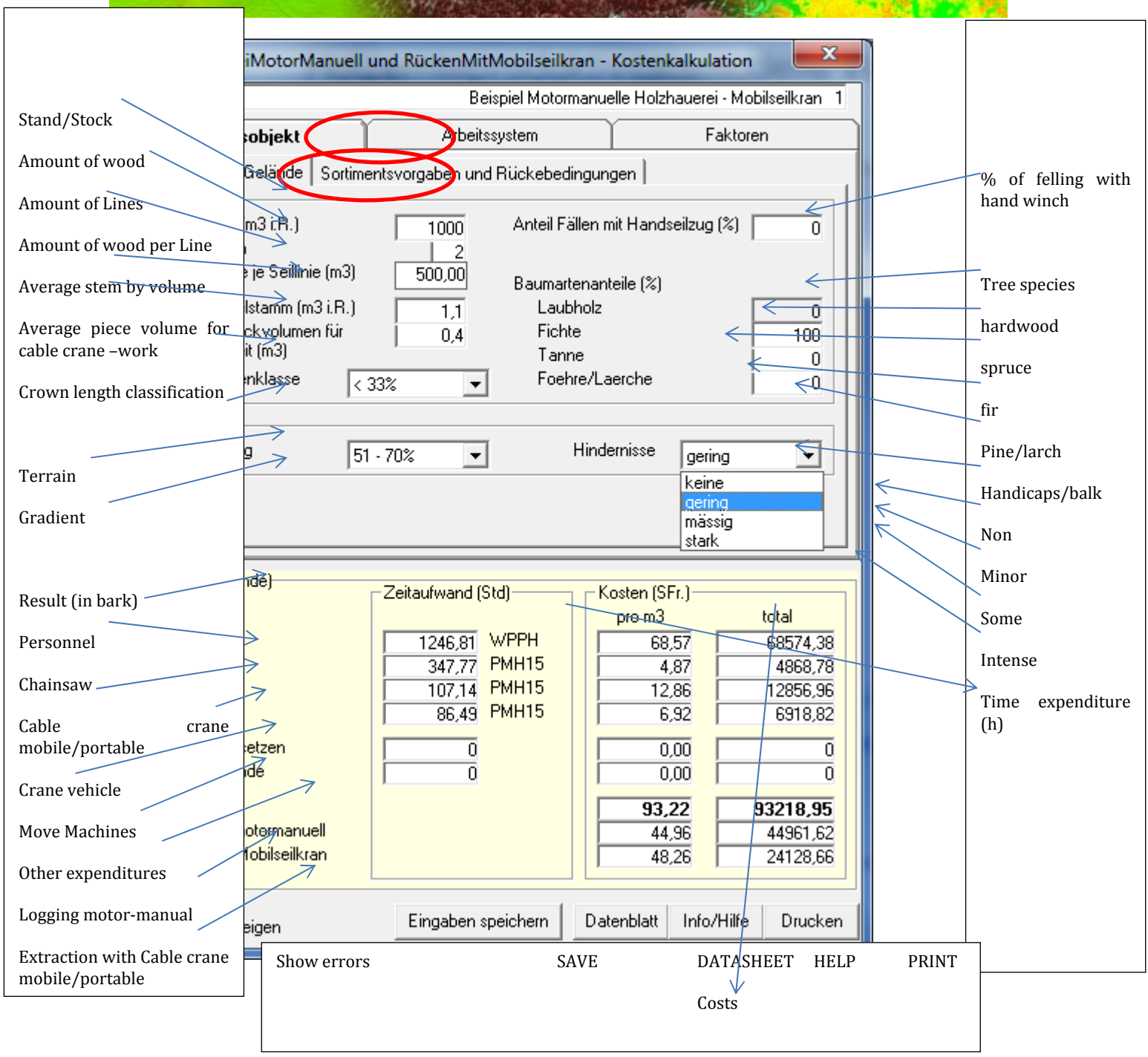
Currency

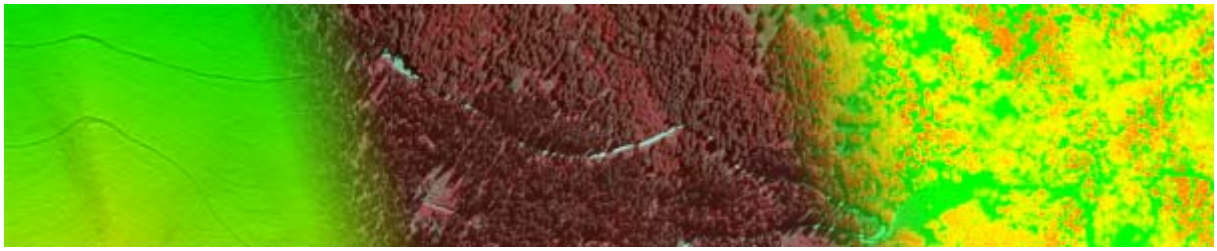
See page 20




Holzernteproduktivitätsmodelle WSL
Holzernte elle WSL
Was ist neu?
Infos
Processchain
Einzelprozesse
Prozessketten
Spezielles
Holzhauerei motormanuell und Schlepper
Holzhauerei motormanuell und Mobilseilkran
RadHarvester, Forwarder, Hacker
Logging – motor manual and Cable crane (mobile)




Stand/Stock
Amount of wood
Amount of Lines
Amount of wood per Line
Average stem by volume
Average piece volume for cable crane –work
Crown length classification
Terrain
Gradient
Result (in bark)
Personnel
Chainsaw
Cable crane mobile/portable
Crane vehicle
Move Machines
Other expenditures
Logging motor-manual
Extraction with Cable crane mobile/portable
% of felling with hand winch
Tree species
hardwood
spruce
fir
Pine/larch
Handicaps/balk
Non
Minor
Some
Intense
Time expenditure (h)
Show errors
SAVE
DATASHEET
HELP
PRINT
Costs
iMotorManuell und RückenMitMobilseilkran - Kostenkalkulation
Beispiel Motormanuelle Holzhauerei - Mobilseilkran 1
Arbeitssystem
Faktoren
Sortimentsvorgaben und Rückebedingungen
Anteil Fällen mit Handseilzug (%)
Baumartenanteile (%)
Laubholz
Fichte
Tanne
Foehre/Laerche
Hindernisse
keine
gering
mässig
stark
Zeitaufwand (Std)
Kosten (SFr.)
pro m3
total
1246,81 WPPH
347,77 PMH15
107,14 PMH15
86,49 PMH15
68,57
4,87
12,86
6,92
68574,38
4868,78
12856,96
6918,82
93,22
44,96
48,26
93218,95
44961,62
24128,66
Eingaben speichern
Datenblatt
Info/Hilfe
Drucken



Assortment targets and skidding conditions

assortment targets

Amount in %

Stem wood

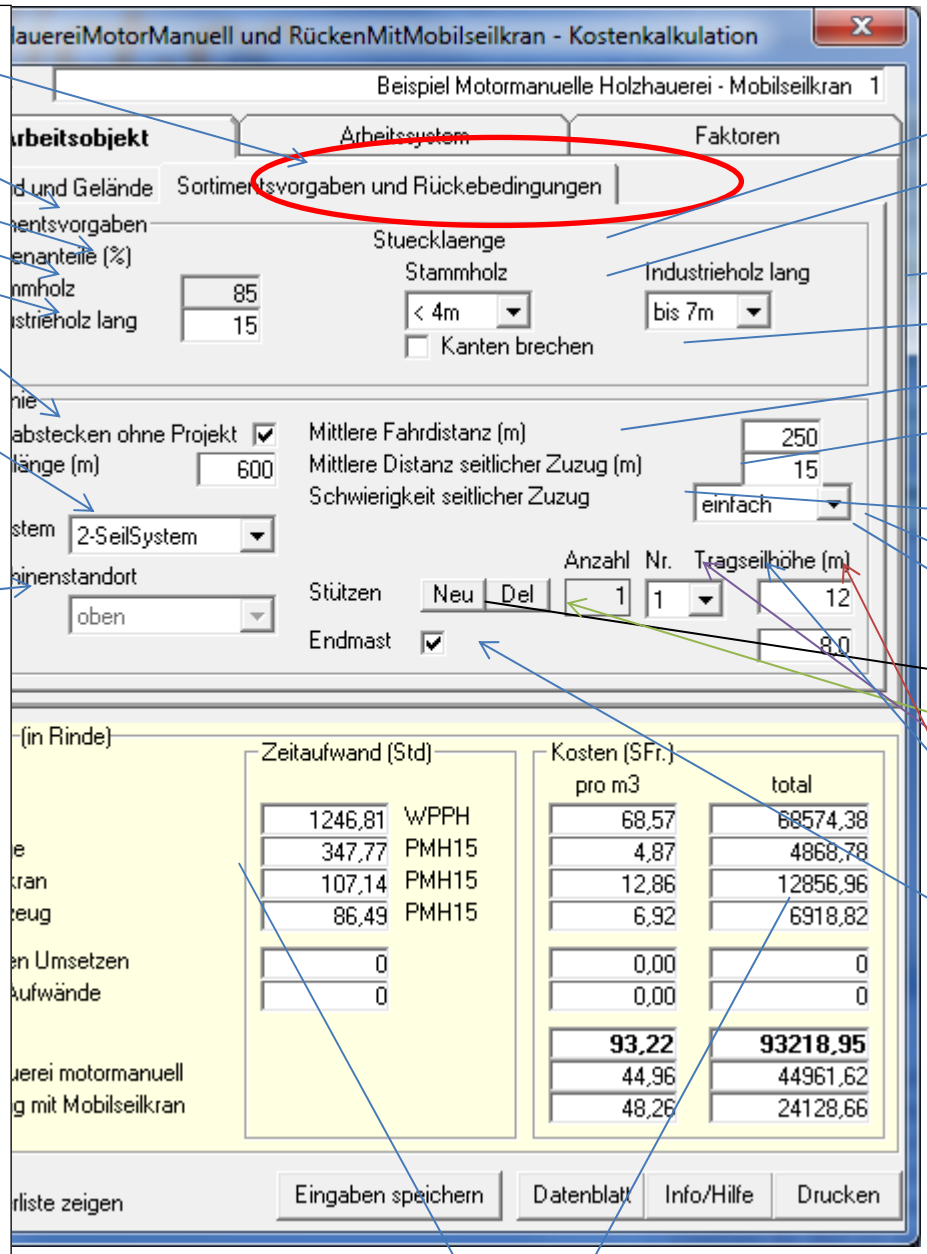
Industrial wood

Mark line without project

Length of line

Cable system [choose between: 2-Seil System=2 cable system;Mehrseil System= Multiple cable system]

Location of Machine[choose between: unten= on bottom;oben=on top



Piece Lengths

Stem wood

Industrial wood[bis=until]

chamfering

Average distance

Average distance lateral transport

Difficulty/complexity of lateral transport

Easy=einfach

Complicated

Intermediate Pole/Pillar

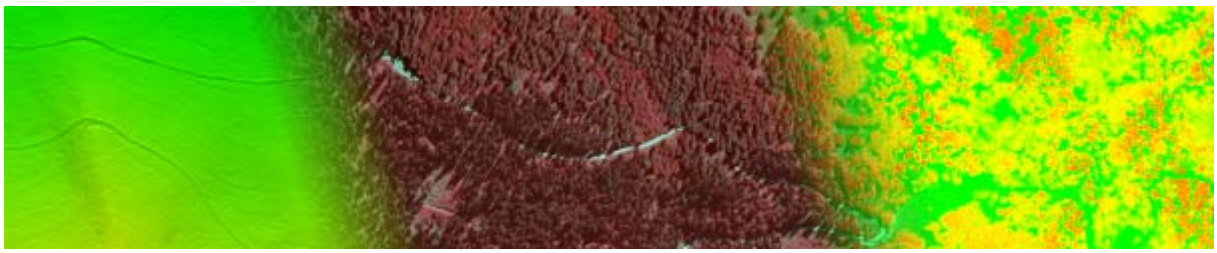
New (additional)

Amount

Number

Skyline/carrying rope height

See page 24



Costs

Personnel

Chainsaw

Cable crane mobile/portable

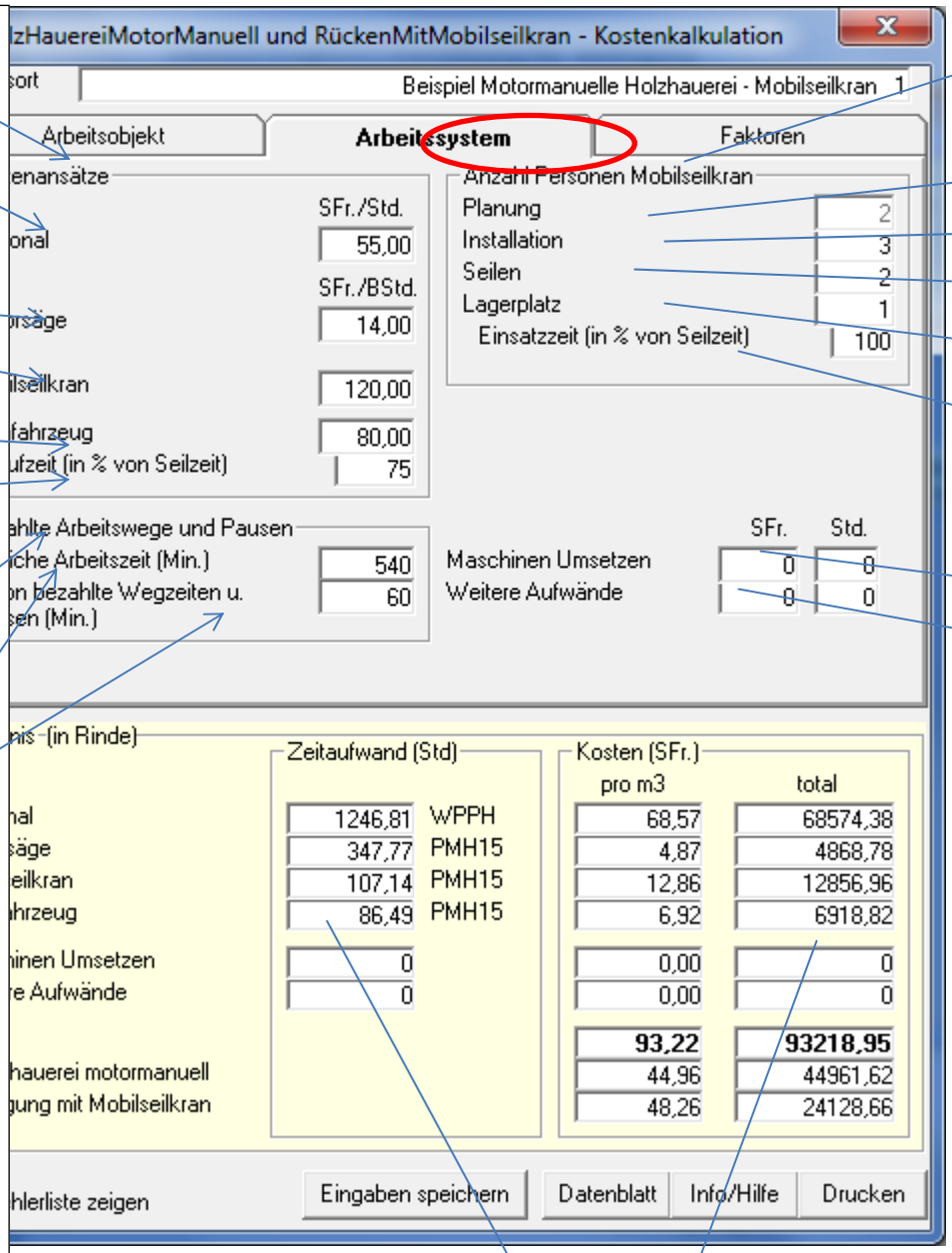
Crane

Operating time (in % cable operating time)

Paid duty stroke/Break

Daily working hours

Of which Paid duty stroke/Break (unproductive paid time)



Number of PersonnelCable crane mobile/portable

Planning

Mounuting/Construction

Slide logs by means of ropes

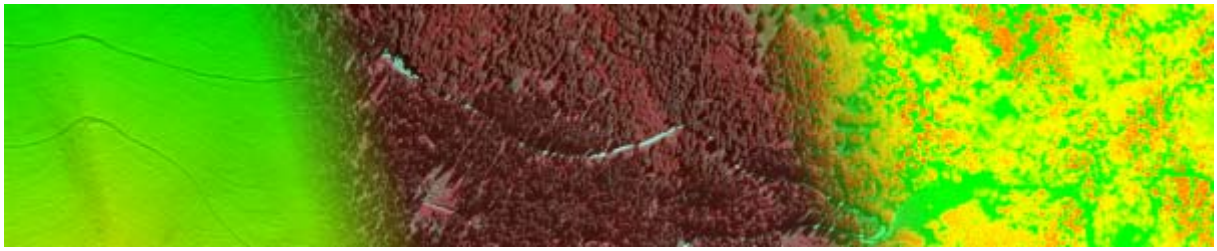
Depot/Camp

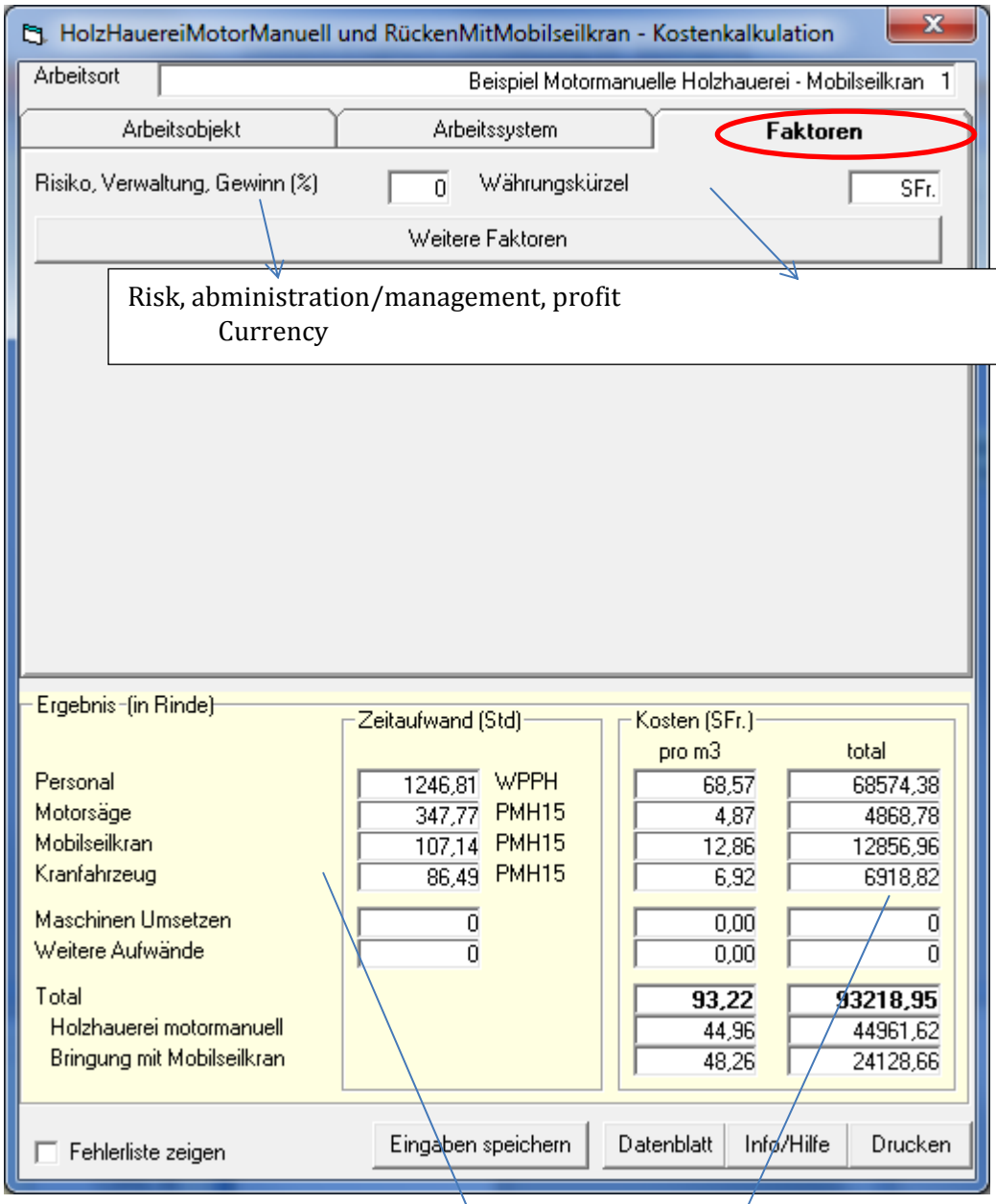
Operating Time(in % of cable time)

Move Machines

Other expenditure

See page 24




HolzHauereiMotorManuell und RückenMitMobilseilkran - Kostenkalkulation
Arbeitsort
Beispiel Motormanuelle Holzhauerei - Mobilseilkran 1
Arbeitsobjekt
Arbeitssystem
Faktoren
Risiko, Verwaltung, Gewinn (%)
0
Währungskürzel
SFr.
Weitere Faktoren
Risk, abministration/management, profit
Currency
Ergebnis (in Rinde)
Zeitaufwand (Std)
Kosten (SFr.)
pro m3
total
Personal 1246,81 WPPH 68,57 68574,38
Motorsäge 347,77 PMH15 4,87 4868,78
Mobilseilkran 107,14 PMH15 12,86 12856,96
Kranfahrzeug 86,49 PMH15 6,92 6918,82
Maschinen Umsetzen 0 0,00 0
Weitere Aufwände 0 0,00 0
Total 93,22 93218,95
Holzhauerei motormanuell 44,96 44961,62
Bringung mit Mobilseilkran 48,26 24128,66
Fehlerliste zeigen
Eingaben speichern
Datenblatt
Info/Hilfe
Drucken

See page 24