# I+ TRAINER EXERCISES

This document offers a number of standard exercises that can be used during Marteloscope training sessions. The exercises are based on a number of scenarios that can be adjusted according to the expertise level of the participants. They are quite generic since the specific needs and challenges for a certain stand depend on local variables and the goals of the local forest district. Therefore, these exercises are meant to serve as an inspiration for Marteloscope managers.



In this document we use the example of the Jägerhäuschen Marteloscope in Bonn, Germany. Numbers that may be relevant to this Marteloscope site might not be for others, so they are to be adapted in line with the local circumstances. The exercises overlap but have different focal points at the centre of discussion.

## Standard thinning

This basic exercise can be carried out in most types of forests, both even-aged and uneven-aged, mixed or monoculture.

| Beginner | Intermediate | Expert |
|---|---|---|
| Remove 50 to 100 m$^3$ while preserving valuable microhabitats. | Remove 60 to 90 m$^3$ while preserving valuable microhabitats. Assure suitable light conditions that favour uneven-aged structure richness. | Remove 70 to 80 m$^3$ while preserving valuable microhabitats. Assure suitable light conditions that favour uneven-aged structure richness and regeneration. |

## Conversion thinning

This exercise is aimed at converting an even-aged stand into an uneven-aged forest. Some parameters that are demanded in this exercises (stand stability, regeneration, species mixture) are not (yet) integrated in the I+ software. They will have to be discussed based on the knowledge of the participants.

| Beginner | Intermediate | Expert |
|---|---|---|
| Remove max. 30% of the trees in a way that does not compromise the stand stability. | Remove max. 30% of the trees in a way that does not compromise the stand stability and enhances natural regeneration. | Remove max. 30% of the trees in a way that does not compromise the stand stability and enhances natural regeneration. Try to maximise the opportunities for tree species diversity. |

## High quality timber

The goal of this exercise is to do a low-intensity but high value thinning, focusing on high quality timber. The financial targets might have to be adapted according to the local conditions.

| Beginner | Intermediate | Expert |
|---|---|---|
| Remove 40 m$^3$ of high quality timber with a total minimum value of 2000 EUR. | Remove 30 m$^3$ of high quality timber with a total minimum value of 3000 EUR. | Remove 20 m$^3$ of high quality timber with a total minimum value of 4000 EUR. |

## Microhabitat preservation

The goal of this exercise is to do a low-intensity but high value thinning, focusing on high quality timber. The ecological value targets might have to be adapted according to the local conditions. Modelling of future TreMs) is not integrated in the I+ software and will have to be discussed based on the knowledge of the participants.

| Beginner | Intermediate | Expert |
|---|---|---|
| Do a thinning of 20% while removing the least possible TreMs | Do a thinning of 20% while removing maximum 100 ecopoints. | Do a thinning of 20% while removing maximum 100 ecopoints. Try to create suitable conditions for future TreMs to originate. |

## Regeneration

The aim of this exercise is to support and enhance tree regeneration in a light thinning operation. It will mainly be suitable for shade-tolerant species. This is not an existing parameter in the I+ software but is mainly related to competing vegetation and light conditions.

| Beginner | Intermediate | Expert |
|---|---|---|
| Do a thinning of 20% that stimulates existing and future regeneration. | Release 10 seed trees to stimulate seed germination. | Release 10 seed trees from different species to stimulate seed germination. |

## Thinning from above / seed tree cutting

A thinning from above aims at removing dominant trees from the canopy in a mature forest, in order to obtain a high harvested volume and to benefit the understory and regeneration.
Clearcut with the preservation of a small number of selected quality trees to ensure natural regeneration of the stand. If time is lacking, participants can just mark the seed trees instead of all the trees. The number of seed trees varies according to the species and site characteristics.

| Beginner | Intermediate | Expert |
|---|---|---|
| Remove $100m^3$ from the upper canopy. | Do a clearcut but preserve 60 trees in the upper canopy . | Do a clearcut but preserve 25 seed trees. |

| Skidding | | |
|---|---|---|
| Mark trails in the stand that can be used to access trees with a harvester or with a winch during logging operations. In mountains, the exercise can be adapted to cable yarding. | | |
| **Beginner** | **Intermediate** | **Expert** |
| Mark skidding trails with a distance of 25 meters between them. | Mark a realistic thinning including skidding trails for a forwarder with a distance of 25 meters between them. | Mark a realistic thinning including winch skidding trails with a distance of 50 meters between them. |