

## **FOREST SOIL PREPARATION FACILITIES AND REFORESTATION OF RISK ASSESSMENT**

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**Abstract:** *Forest soil preparation is one of the basic qualities of forest restoration. Forest soil preparation is a big range of soil-preparation machinery and accessories range. Forest soil preparation not always is done in high quality. Soil preparation quality affects afforestation and forest growing process in future. In this preparing risk assessment in forest soil preparation process is needed.*

### **1. Materials and methods**

To realize the objectives there should be a complex measure of risk analysis of the causes of critical control points (HACCP).

HACCP stands for Hazard Analysis Critical Control Point, it is Risk analysis of the causes of critical control points, the critical point (phase identification, and the whole process management).

HACCP is a tool that enables management of the company's risk control causes more structured approach than is possible with traditional inspection and quality control procedures. It is potentially able to identify their products or process in manufacturing or technology process steps.

To begin the use on HACCP-based systems are the first to take a risk assessment of forest soil preparing process.

Risk assessment is processes which identifies the risk of probable causes of the causes and assess their possible effects.

Eliminate the two important factors related to risk assessment:

- Risk likelihood or probability of the cause;
- The consequences if it is realized.

Risk assessment is carried out with analytical performance. Risk assessment includes both quantitative and qualitative risk assessment. Risk assessment may describe the types of forest soil, soil preparing technology, the substrate potential fruitfulness, wetness, temperature fluctuations during rearing, etc.. And also include the available data and literature research and consultations with other industry specialists.

The traditional evaluation model consists of the cause of risk identification, characterization, practical expressions of the assessment and characterization. Next described the risk assessment scales (Table 1) in numerical terms, evaluate the risks at each stage of the process (Blija, 2007).

**Table 1. The scale of risk assessment (Neyts et al., 2000)**

Probability	high	4	5	6	7
	real	3	4	5	6
	small	2	3	4	5
	very small	1	2	3	4
		very limited	moderate	serious	very serious
Effect					

Using risk analysis

The identification of critical control points (CCP's) can also be done by using the risk analysis and the obtained risk categories.

For example:

- Risk category 1                               - no additional measures or controls required
- Risk category 2 and 3                       - control points
- Risk category 4 and more                 - CCP

## 2. Results and discussion

Before a good quality afforestation a forest soil has to be prepared, this preparing improves tree ingrowths and further development. When we look closer to forest soil preparing procedure we can establish, that one form of forest soil preparing technology is not everywhere usable. In practice is shown that soil preparing mechanism that at one point makes an excellent soil preparing but isn't capable of a good quality preparing at the other. This aspect is the main argument against soil preparing unification – to reduce only at use of one mechanism. Forest soil preparing mechanisms are divided in three big groups: ploughs, forest power harrow and forest soil diggers.

We will make a risk analysis and critical control point determination to preparing process so we could effectively use an appropriate soil preparing mechanism and not cause problems to forest regeneration. We can not only analyze the operation of mechanism besides the preparing object – forest soil. We will select three different forest soil objects: wet soils, normal soils and slope forest soils.

The risk analysis of the use of forest soil preparing mechanism in different forest soils is summarized in Table 2.

**Table 2. The scale of risk assessment in reforestation after forest soil preparing process**

	Wet forest soils	Normal forest soils	Slop forest soils
Ploughs (6 mechanisms )	2 ...7	1 ... 4	2 ...7
Forest power harrow (5 mechanisms )	4 ... 7	1 ... 4	2 ...7
Forest soil diggers ( 6 mechanisms )	2 ... 4	2 ... 5	1 ... 5

It is possible to use six modified forest ploughs in forest soil preparing process. That is why the risk assessment in each of forest soil objects is in bigger or smaller value range. From the acquired results we can infer that forest plough use in forest soil preparing is acceptable but it also shows a great risk values. The great risk values show the critical control point and all amending procedures.

A similar situation develops in forest soil preparing using soil power harrows. But a little bit different features are shown when the forest soil is prepared with soil diggers. It is so because the soil digger mechanism is one of the considerate and mobile ways of soil preparing.

### 3. Conclusion

1. Risk assessment in reforestation after forest soil preparing process indicates problems.
2. Critical control points not only show problems, but also define the needs of monitoring.
3. In future deeper research of forest soil preparing process is needed.

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