# Forest skylines in Turkey

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The forest skylines are being used especially at mountainous Artvin region in Turkey. They are mobile strong transport machines. Koller K 300, URUS M III and Gantner forest skylines were examined during logging from forest areas of mountainous Eastern Block Sea Region. In this study, the continuously time measuring technique is used. The calculated values are evaluated statistically according to standard base distance. The methods used for cost calculations are accepted by FAO.

The URUS M III mobile skylines which can be set up for longer distances were found stronger but more expensive whereas, the Gantner forest skylines were more productive for over 600 m, but needs a lot of time for setting. The differences between productivity and cost depends on the production type of forest derived from compartment, the number of workers, the direction, distance and slope of transport.

**Key words:** Steep terrain, logging, forest skylines, Eastern Block Sea region, Turky

Turkey has 20.2 million hectare of forest of which 8.5 million hectares are productive forest. These forests are in steep terrain and hence, cause forest management problems and difficult logging operation.

The construction of forest roads are more difficult and expensive in mountains. Also there exists technical and economic problems because of obtaining and using of necessary machines during logging in forest. Generally, forest skylines have been used in solving these problems.

The forest skylines, which have indirect utilities in forest silviculture, environment, production, work organisations are more expensive than the classic and economic forest transport methods such as human power.

In Turkey, forest skylines are of various categories such as i) up to 300 m, ii) middle distance (300 m - 600 m), and iii) long distance forest (up to 1500-2000). The road density is approximately 8-10 m/ha, for that reason usage of logging machines are restricted, but usage of forest skylines are necessary especially in mountains.

Forest skylines can be settled between the distances 200-2000 m. with minimum harm to forest soil and transporting material. They are mobil or yarder strong transport machines. They can make transportation in two directions and these machines can be settled on the field by different combinations properties.

In Turkey, forest skylines such as Wyssen, Hinteregger and Baco long-distance forest skylines were established after the recommendation of FAO in 1960s. In the following years, skylines such as Koller K 300, URUS M III and Gantner long-distance skylines were bought.

The forest skylines are being used especially at mountainous Artvin region in Turkey. Initially skylines were criticised because of unemployment, but presently it has a large demand and is supported by the government forest management.

## Materials and methods

The operations of Koller K 300, URUS M III and Gantner at Eastern Black Sea region in the last 10 years are researched and results evaluated. In this study, the continuous time measuring technique is used. The calculated values are evaluated statistically according to standard base distance. The methods used for cost calculation are accepted by FAO.

## Results and discussion

Koller K 300, URUS M III and Gantner are the forest skylines that have most usage in Turkey. Many productivity tests have been done in different places of Eastern Black Sea Region, and the different productivity and cost values are determined (Acar 1997 a and b, Topalak 1998 and Eroglu 1997). On the other hand in position of using the same land properties and the same

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Table : The values of productivity and cost for Koller K 300, URUS M III and Gantner Skylines

| Skyline | Study Area | Conifer/ Hardwood | Transport Distance (m) | Number of Workers | Average Slope (%) | Productivity ($m^3$/hour) | Cost ($/hour) |
|---|---|---|---|---|---|---|---|
| URUS M III | Giresun | Hardwood | 250 | 3 | 65 | 3.582 | 6.90 |
| URUS M III | Giresun | Hardwood | 250 | 4 | 70 | 2.755 | 6.70 |
| Koller K 300 | Giresun | Conifer | 250 | 4 | 60 | 3.016 | 8.79 |
| Koller K 300 | Giresun | Hardwood | 250 | 4 | 50 | 5.555 | 4.94 |
| Koller K 300 | Rize | Conifer | 160 | 3 | 40 | 5.490 | - |
| URUS M III | Trabzon | Conifer | 180 | 4 | 60 | 3.432 | - |
| URUS M III | Trabzon | Hardwood | 180 | 4 | 60 | 3.724 | - |
| Koller K 300 | Artvin | Conifer | 188 | 4 | 45 | 4.997 | 6.64 |
| Koller K 300 | Artvin | Hardwood | 100 | 4 | 32 | 4.755 | 6.86 |
| URUS M III | Artvin | Conifer | 128 | 5 | 65 | 7.944 | 6.73 |
| URUS M III | Artvin | Hardwood | 250 | 5 | 65 | 5.525 | 7.94 |
| Gantner | Artvin | Conifer | 1400 | 5 | 80 | 4.969 | - |
| Gantner | Artvin | Hardwood | 1100 | 5 | 75 | 5.010 | - |

machine type the values that have been calculated were found similar (Table). The transport direction for URUS M III and Koller K 300 mobil forest skylines were always from bottom through the upperside. But for Gantner, the transportation direction is from upside through the bottom.

The difference between productivity and cost depends on the production type of forest, yield derived from compartment, the number of workers, the direction, distance and slope of the transportation. The productivity of conifer transport is minimum (3.514 $m^3$/hour in 250 m length) and maximum 5,555 $m^3$/hour) for Koller K 300, minimum (2.681 $m^3$/hour) and maximum (4.067 $m^3$/hour) in 250 m length for UEUS M III; and determined minimum (2.565 $m^3$/hour in 1250 m length) for Gantner forest skylines (Table).

Again with these three forest skylines in the same regions, hardwood transportation productivity in 250 m distance base for Koller K 300 changes between 1.902 m3/hour to 3.016 m3/hour. It changes between 2.471 $m^3$/hour and 5.525$m^3$/hour for URUS M III. This value is found 4.408 m3/hour in 1250 m for Gantner (Table).

The forest road network plan and transport studies have great importance. The URUS M III forest skyline can be settled on long distances than that of Koller K 300. It is found stronger, but expensive. It is determined that the Gantner forest skylines are more productive for long distance.

The present study showed that, the rules such as preparing a work organisation before transporting from compartment, increment of number of working days, the preparing of the composition in working area and providing the eight hour working programme order, and personnel safety are important aspects for running skylines.

## Reference

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The present paper that deals with skylines in Turkey may, at a first glance, seems unrelated to Nepal's forestry sector as no serious works have been done it. But, it is worthwhile here to mention that more or less similar technology was introduced in Jiri through the Swiss aid way back in 1960s. This, for some reasons, could not operate. However, the one constructed at Sikha Valley of Myagdi District in 1975 by the Japanese aid is still in operation. It is helping the local people transport forestry products and manure for their crop fields. Whether or not skylines in the Nepal's forestry sector would be economically and environmentally beneficial or it proves only a matter of pride to the Nepalis is yet to be studied. The present paper has been published in a hope that some researchers may find it an interesting topic of research and suggest to make it a better and environmentally friendly option of forest harvesting for the mountainous country like ours.

Editor