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# A NOTE ON TRIALS MADE WITH KOROLEFF'S WIRE-SKIDDING METHOD AND MODIFICATIONS THEREOF

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*Introduction*—The author had an opportunity of reviewing the publication "WIRE-SKIDDING, Wood Transportation by Gravity over a Suspended Wire", by M/s. A. Koroleff and R. D. Collier published by Pulp and Paper Research Institute of Canada for the *Indian Forester* ( vide *Indian Forester*, Volume 80, No. 9, September 1954 ) and was deeply impressed by the simplicity of the method and the vast possibilities of its application to the hill forests in India. He also had an opportunity of coming in personal contact with Mr. Koroleff during the latter's assignment in India in 1955 as a Food and Agriculture Organization Expert on logging and had further opportunities of discussing this method. As a consequence when he was appointed Conservator of Forests, Tehri-Garhwal Circle, U.P., in April 1957, he took the earliest opportunity of trying out Mr. Koroleff's method in the forests of Chakrata Forest division and the results of the preliminary trials made are given in this note.

The author is much indebted to the President, Forest Research Institute and Colleges for the kind loan of the wire-skidding equipment received from the Food and Agriculture Organization.

*Equipment*—The equipment consists of the following :—

( 1 ) Steel-wire of S.W.G. 8 with a breaking strength of over 2 tons in single lengths of 500 to 1,500 feet according to requirements.
( 2 ) A Lug-all Winch Hoist of 1½ tons capacity for tensioning the main wire.
( 3 ) A wedge wire-grip for gripping the main wire while tensioning.
( 4 ) An old truck-tyre for acting as a stop at the discharging station.
( 5 ) Expendable hardwood load carriers ( see figure 1 ).
( 6 ) 14 S.W.G. galvanized iron-wire for slings.

*Brief description of Koroleff's method*—The method consists of stretching the steel-wire over the required span ( up to a maximum of 1,500 feet ) with an over-all down grade ( the declination of a straight line between the upper and lower terminals ) from about 25 to 70%. The main wire is anchored to two suitable trees at the top and bottom of the span and is then tensioned with the help of the wire-grip and the winch-hoist. Loads of 200 to 300 lb. each can be transported down this wire at high speed with the help of expendable wooden load carries and wire-slings. A pair of wire-slings is used to support each load which is hung from the load carriers by passing the loop of the slings through the load carrier and then placing the latter on the main wire so that the main wire passes through the hole in the carrier ( see figure 2 ). When the load is released, it travels down this main wire in a smooth fast glide which ends at the lower station when the load strikes against the tyre fixed on the main wire with guy ropes. On impact, the load is automatically discharged and the carrier and sling wire also fall down.

For further details of the method, a reference may be made to "WIRE-SKIDDING Wood Transportation by Gravity over a Suspended Wire", by M/s. Koroleff & Collier, 1954 ;

a summary of which has also been circulated by the Food and Agriculture Organization of the United Nations under their Forestry Equipment Notes C. 16.56 ( October 1955 ).

*Trials in Chakrata*—The first trials were made in compartment 3B of Konain block with billets of fir and spruce from dead and dry trees. The slope selected was of about 30 degrees and the wire was stretched over a span of about 600 feet.

As the original wire tensioning equipment had not been received from the Forest Research Institute and Colleges, an improvised device consisting of a horizontal capstan was used. This capstan was similar to the one that is commonly used to tension track-ropes of the Donald Aerial Ropeway. The details can be seen in figure ( 3 ). The capstan was used at the lower station while the upper end of the main wire was suitably anchored to a tree at the top station.

Different loads consisting of 1, 2, 3 and 4 billets each were tried, each billet being about 3½ feet long and 100 lb. in weight. It was found that with 16 gauge-wire-slings, not more than three billets could be sent down together. For loads of 4 billets slings of double wire had to be used. It was also found that the most convenient load which could be handled successfully by the type of labour available was that consisting of 2 billets weighing about 200 lb. Loads heavier than this were not found convenient for loading particularly because no attempt had been made to construct any of the different types of launching platforms recommended by Koroleff and the loading was done by labourers lifting each load by hand and placing the carrier on the wire. It was found that loading required considerably more care than one would have imagined in order to ensure proper balance. It is quite true that the labour was completely inexperienced in this sort of work and that with more experience, the accidental discharge of loads due to bad balancing would be completely eliminated. In fact, there were very much fewer accidental discharges on the second and subsequent days of the trials than on the first.

*Trials with modified carriers*—Trials were then made to evolve some other type of load carrier instead of the original one recommended by Koroleff, which though simple and cheap enough to make, cannot be manufactured locally inside the forests and will have to be made in a town in a wood workshop. First of all a billet with a 'V' knot cut in it was tried as shown in figure ( 5 ). This method has also been recommended in the Forestry Equipment note C. 16.56, but our trials in Chakrata show that this type of arrangement is not very practical as very accurate balancing of the load is required. The billet which acts as a load carrier becomes the arm of a very sensitive balance which is supported on a fairly narrow fulcrum ( i.e., the main wire, the diameter of which is only 0·16″ ) and is, therefore, liable to tilt on one side with the slightest increase of weight. This method was not found to be successful at all.

The author then devised a very simple load carrier, which can be made by any one who can handle an ordinary hand-saw in a matter of minutes and it has proved as successful as the original load carriers. This load carrier consists of a piece of round wood about 4 to 6 inches long and 2 to 3 inches in diameter cut off from the branches of any tree that may be locally available. Two saw cuts are then made, each of which starts from the middle of the piece and goes half-way across, making an angle of 45 degrees with the axis. The details of the carrier can be seen very clearly in figure ( 6 ).

By sawing twice through one of the cuts, it was made sufficiently wide to allow the main wire to pass. The other cut which takes the sling wire need not be widened as a single saw-cut is enough to admit the sling wires. The important thing to remember is to make the cuts at the proper angle and to see that each of them reaches exactly up to the centre of the small billet so that when the load is suspended, the carrier remains vertical and there is no chance of the load being accidentally discharged. Figures ( 7 ) and ( 8 ) shows this type of carrier in operation. The carrier worked very successfully and was found to be more tolerant

of lack of balance in the loads than even the original carrier supplied with the equipment. The main advantage of this carrier lies in its utter simplicity and ease of manufacture.

*Trials with long billets*—Attempts were made to transport billets of 6 to 8 feet length by using two carriers and suspending the billet parallel to the main wire instead of at right angles. The few trials made were unsuccessful as it was found that two load carriers could not move along the main wire maintaining a constant distance between them. As the load moved downwards, the distance between the carriers fluctuates, causing the sling wires to slide and resulting in the discharge of the load *en route*. It is hoped that this difficulty may be got over by using very short slings which will reduce oscillations. Further trials will be made on these lines.

*Trials with sawn timber*—Some trials were also made with the skidding of sawn timber in Compartment 21 of Rikhnar block near Kharambalani. The slope selected was about 27 degrees with a span of about 1,200 feet. In these trials, the tensioning was done from the top station with the help of the Lug-all Winch Hoist supplied with the equipment. This method of tensioning was, naturally, found to be far more efficient and quick than tensioning by a locally made capstan. Pieces of sawn timber from 6 to 10 feet in length were successfully slided down. It was, however, found that in the case of longer lengths, considerable swaying of the load occurred particularly after the load had gone more than half-way across the span. This excessive swaying was mainly due to a fairly strong cross wind that was blowing at the time of the trials. It was also noticed that with longer lengths, the sling wires had a tendency to slip inwards ; thus disturbing the balance and causing accidental discharges *en route*. More accurate balancing of the loads than in the case of small billets was found necessary. This difficulty can, however, be got over by using trained labour used to working on the Donald Aerial Ropeway.

In order to reduce the velocity of the load at the bottom station to prevent damage to timber, the station was chosen on the opposite slope in such a manner that it was slightly higher than the lowest point of sag of the main wire. This resulted in a deceleration of the load as it passed the lowest point of sag and approached the bottom station. The loads were thus striking the tyre fixed at the bottom station with fairly low velocities and no damage was caused to the timber.

*Cost of installation and working*—It was found that 4 labourers and 1 carpenter would be required for one day to instal the equipment and that for subsequent working, 6 men would be required daily. It was also found that in six hours of working, 600 billets ( 100 lb. each ) could be slided down with ease. In fact the rate is bound to increase once the labour gets experienced in this type of work.

| | Rs. |
|---|---|
| *Cost of installation—* | |
| 4 Men for 1 day at Rs. 2·00 each per day ... ... ... | 8·00 |
| 1 Carpenter for 1 day @ Rs. 4·00 each per day ... ... | 4·00 |
| TOTAL ... | 12·00 |
| *Cost of running—* | |
| 4 Men for preparing loads and 2 Men for launching @ Rs. 3·00 per day ... ... ... | 18·00 |
| *Cost of dismantling—* | |
| 4 Men for 1 day @ Rs. 2·00 per day ... ... ... ... | 8·00 |
| Total cost of sliding 600 billets ... ... ... ... | 38·00 |
| *Cost of carriage of billets by manual labour—* | |
| 600 Billets @ Re. 0·25 per billet ... ... ... ... | 150·00 |

*Saving*—It will thus be seen that a nett saving of Rs. 112·00 is effected by using wire-skidding equipment instead of manual labour for transporting 600 billets.

*Conclusion*—It is the author's firm belief that this method of transporting timber, both sawn and in billet form, over a single wire holds great possibilities, provided the installation of the main wire is done with intelligence and care after chosing a suitable site. There is no doubt, whatsoever, that as far as transportation of small sized material such as pulp wood, fire wood, and sawn timber up to 6 feet length, is concerned this method with or without the modification described above, would be found most suitable and economical for our hill forests once the inherent inertia of our forest contractors, who are always chary of any new departures, is over-come. The method may also be found very useful in the *Bhabar* and Siwalik forests of the Uttar Pradesh, for the transportation of firewood, bamboos, *baib* grass, etc.

The trials described above were made at the end of May and beginning of June 1957 and could not be continued further due to on-set of rains. Further trials will be continued after the rains are over and a further report published.

### BIBLIOGRAPHY

(1) Koroleff, A. and Collier, R. D. "Wire-Skidding – Wood Transportation by Gravity 1954" – Pulp and Paper Research Institute, Canada. Montreal, Canada. Price: $2 (Two Dollars).

(2) Food and Agriculture Organization (FAO) Forestry Equipment Notes. No. C. 16.56 (October 1956).

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## NEWS AND NOTES

### Indian Council of Agricultural Research

### KATTE DISEASE IN CARDAMOM

*New Delhi*: Experiments in Bombay State have shown that the *Katte* disease of cardamom can be completely controlled by removing and destroying diseased plants from the garden and transplanting only disease-free seedlings.

The disease has been causing serious losses to cardamom growers for the last many years.

It has also been found that the disease is carried from infected plants to healthy ones by an insect known as the Banana Aphid. Hence, it is necessary that healthy seedlings are not transplanted in the garden for six months to a year after the diseased plants have been removed.