

## A SWIVELLING AND SELF-LEVELLING FORESTRY MACHINE CAB



*Figure 1 - The self-levelling and swivelling cab suspended from an arched column attached to a swivelling socket*

This new cab-design (Figure 1) improves the harvester operator's ability to achieve a higher sustainable productivity. The cab is suspended from an arched column connected to a swivelling socket. The inventors are four Swedish brothers, formerly working as forestry contractors. The purpose of the new cab design is to reduce the amount of skewed and twisted work postures, which are often frequent among operators of logging machines.

A Swedish three year follow-up study (Gellerstedt 1994), shows that the productivity of a harvester increased by 5% to 10% after changing from a rigid to a swivelling and self-levelling cab.

The ability to sit straight is what most ope-

rators point out to be the most desirable feature of the self-levelling and swivelling cab. The low noise level (66 dB(A)) is also appreciated, as is, the operator controlled ability to swivel the cab around on its vertical axis. The swivelling gives better visibility and also helps reduce the amount of head rotations. Furthermore, jarring motions and extreme swing due to uneven terrain are much less bothersome than in conventional cabs. Vibration levels at the operator's seat are low, equal to those in conventional Scandinavian harvester cabs.

The conclusion is that the operators are able to work longer with sustained pace and work quality in this type of cab when compared to conventional rigid cabs.

## WHY A NEW CAB?

Operators of forestry machines are exposed to an array of fatigue causing factors: vibrations, jarring motions due to uneven terrain, uncomfortable and fixed work positions, the constant twisting and turning of the head, neck and cervical regions as well as the cyclic repetition of the lever handlings. Results of a health investigation of 1174 forest machine operators in Sweden point out a prevailing average overload syndrome of 50%, mainly characterised by neck/shoulder complaints [Axelsson 1990].

## HANGING THE CAB

The pursuit of suitable technical solutions to those health problems has been in the works for a number of years. In this design, the cab is suspended from an arched column which is in turn connected to a swivelling socket (Figure 2). The cab remains vertical in terrain with a 15° slope or less and can swivel around on its vertical axis from 0° to 270°.

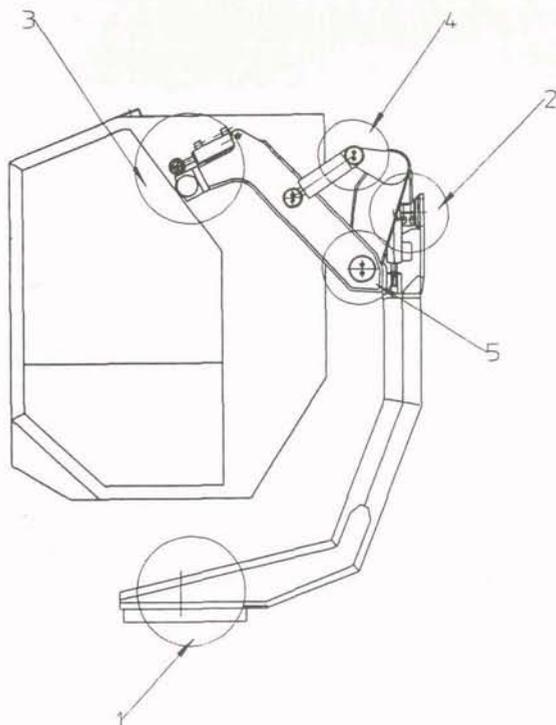


Figure 2 - Sideways view of self-levelling cab, 1. Swivelling socket 2. Sideways cushioning 3. Lengthwise cushioning 4. Horizontal cushioning 5. Side beam.

The cab's swivelling ability is controlled by the operator and separated from the movements of the boom. This gives the operator the means with which to adjust the cab for optimum visibility at all times.

The arched column has at the beam seat supporting the cab, a vibration reducing and shock absorbing joint with the purpose of keeping the cab horizontally levelled sideways. Above this joint is a U-shaped cab carrier beam with one shock absorbing joint at each side of the cab, working to keep the cab in a horizontal fashion lengthwise. To reduce the amount of vertical vibrations, the U-shaped cab carrier beam is hanging in an absorbing joint. The stiffness of these absorbing joints can be manually adjusted.

The cab is intended to be mounted on new or used harvesters or forwarders. Approximately 50 cabs have been produced up to 1995. Of these, there are currently 45 mounted on harvesters and 5 on forwarders. Thirty are mounted on older and renovated machines. The cost for a fully equipped self-levelling cab ranges between NZ\$22,000 to \$33,000.

## "A DAMN GOOD IDEA"

The operator's opinion is that the suspended, self-levelling and operator controlled swivelling cab allows for an improved comfort when compared to conventional rigid cabs.

- "Damn good idea! I'm very satisfied, feel far more comfortable due to its ability to keep itself level. The swivelling is good for the yield."

- "One tends to push the envelope just a little bit further", as another operator put it.

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Axelsson, S.,Å., Pontén, B. (1990) : New Ergonomic Problems in Mechanized Logging Operations. Int. J. of Ind. Ergonomics n:o 5.

Gellerstedt, S. (1994) : (A follow-up of the Pendo Cab mounted on Timberjack 250 S E), in Swedish. Arbetsdokument nr 14. Swedish University of Agriculture Sciences, Dept. of Operational Efficiency.