

An Assistive Technology Application for Narrow Tractors ROPS

Pessina D.

Institute of Agricultural Engineering, University of Milan

Via Celoria, 2 – I 20133 Milan

Ph: +39 02 502 16876 - Fax +39 02 503 16845 - domenico.pessina@unimi.it

Keywords: foldable safety frames, automatic tilting, slope, orchard and vineyard

Objectives

Assistive Technology (AT) is nowadays commonly used not only referring to rehabilitative devices, but also for those able-bodied find useful. Technology is so often created without regard to people with disabilities.

On narrow track tractors, typically used in orchards and vineyards, a simple two-pillars front mounted roll bar is frequently fitted for safety reasons, being it tiltable in order to allow travelling the machine between rows without damaging the low branches.

Its correct operation requires the operator takes an active role in making sure the ROPS is properly adjusted when not in a low clearance situation; that is a task some operators may not consistently perform, and the result is a permanent arrangement of the roll bar in its horizontal position, so that the protection provided in case of an overturn is completely wasted.

Methods

Some solutions were recently found in order to avoid operator's intervention to perform the described operation, with two different automation levels:

- 1) an aided execution, carried out through specific devices, electrically, hydraulically or pneumatically driven;
- 2) a completely automatic execution, using the above specified devices, but activated only if an overturning occurs.

Relevant to this last possibility, some devices were recently proposed. In the USA, NIOSH has developed the AutoROPS, a safety frame passively controlled, staying in a lowered position until a rollover condition is determined, at which time it deploys to a fully extended and locked position.

In Turkey, Tam Test developed a device including automatically deployable bars welded at the top of a two pillars front mounted roll bar for narrow tractors, able to stop the continuous rollover thanks to its penetration into the soil.

Results

On the other hand, the tilting operations of the roll bar could be usefully carried out with a simple device, consisting in a hydraulic cylinder welded on one of the two pillars at an extremity, and to the relevant mounting of the ROPS at the opposite one. If a new fitting is provided, the cylinder could be driven via a dedicated circuit, while in case of retrofitting one the connectors of the tractor hydraulic circuit should be considered.

Some experimental samples in retrofitting applications were arranged and positively tested on narrow track tractors, as in view to verify their functionality, as in order to define the best ROPS tilting speed.