



Safety aspects in agricultural machinery

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What does the accident means? Increase in level of mechanization enhanced the productivity and production in the last century. But on the other hand, it has also increased casualties through accidents. Loss of human life brings sorrow to the victim's family and to the society; in addition to causing considerable loss to the country as a whole. There is a wide ignorance or misconception about the meaning of accident. The definition of accident states that accident is an unexpected, unplanned and unwanted event or a sequence of events, occurs through a combination of causes and results in physical harm (death or injury) to an individual, damage to machine or properties, economical loss or a near miss.

Status of accidents in agriculture: As per ILO study reported in 2009, a total of 3,35,000 worldwide fatal workplace accidents happen each year; out of which 1,70,000 are related to agriculture. In a state like Punjab, having intensive mechanization in agriculture, the accident incident rate is 1.40 per 1000 agricultural workers per year. A total of about 5,700 major agricultural accidents happen in Punjab every year. Out of these 22 per cent of accidents lead to loss of life to accidents victims. While 72 per cent of accidents are related to farm machinery, 1 per cent are related to hand tools and 27 per cent are related to others *viz.*, snake bites, wells, agricultural chemicals, etc. The sprayers and chaff cutters are involved in majority of accidents (18% each) followed by tractors and trailers (13%), electric motors and pump sets (12%), wells/tubewells (8%) and threshers (7%). Various interventions to reduce these accidents include development of safety gadgets, strengthening of legislations, educational and training measures.

Safety gadgets for farm machines:

Sprayers: The accidents due to poisoning of insecticides during spray by a sprayer are a common feature in the villages. Most of the time insecticide/pesticide poisoning requires medical treatment; however, in worst cases death may also happen. Such accidents happen because of use of more lethal insecticides, higher dose of application, use of no safety kit by the farmers, wrong practices of operation, lack of knowledge, spray with empty stomach,

physical contact with chemicals, exposed injury, consuming eatables during spraying, etc. Most of these accidents can be avoided by use of spray safety kit, which includes mask to cover mouth and nose, goggles to protect eyes, and gloves to protect hands. These accidents can also be reduced by adopting the recommendation about chemicals, spraying practices, etc.

Chaff cutters: The frequency of chaff cutter accidents is also very high (18%) due to its status of household item and twice daily use. Most of these accidents are during use of power chaff cutter. Such accidents are caused due to entanglement of loose clothes, loose hairs or wrist ring and result in amputation injuries to upper limbs *viz.*, fingers, hands and arms. Most of these accidents can be avoided by use of safety features with chaff cutters.

Safe feeding chute (BIS-9129-1975): Feeding chute of recommended length is the most important safety device to reduce chance of accidental amputation injury. The feeding chute of chaff cutter must be at least 90 cm long and its upper cover must be at least 45 cm long as shown in figure.

Feed reversal mechanism: It is an important safety device to reduce injury in use of power operated chaff cutter. Its function is to reverse the direction of rotation of feeding rollers, through a gear lever, in case of accident.





Covers for moving parts: Covers on moving parts that include flywheel, belts, gears, pulleys, feeding rollers, etc. reduce chance of accident during chaff cutting operation.

Warning roller: Touch with a wooden roller in feeding chute signals a warning to the operator to pullback his hand to avoid injury from feeding rollers and/or cutting blades.

Flywheel lock and covers on blades: Flywheel lock doesn't allow rotation of flywheel, when the machine is not in use. Also, covers on blades protect children against accidental injury.

Electric motors and pump sets: The accidents related to electric motors and pump sets results in either loss of life or severe electric shock. Farmers are hesitant to disclose such accidents due to fear of legal implications. Many of them use illegal methods to run electric motors on single-phase supply due to non-availability of 3-phase supply for adequate period especially during paddy season (May to August); thus, have purposely loose and open connections of the motors and control panel. Such accidents happen due to contact with uncovered live wires, faulty electric connection, fault in earth connection, close

proximity of connections, use of motor without starter, lack of technical knowledge, lack of repair and maintenance, etc.

Wells/ Tubewells: Most of the tubewell related accidents occur due to fall down in well or presence of poisonous gases in tubewell pit or due to collapsing of wells during digging. Many times the farmer or labour falls down in well at night time or due to slippage in rainy season. Poisonous gases, mainly carbon dioxide (CO₂), accumulate in tube well pits during monsoon season. When a person descends into tube well pit for repair or maintenance of electric motor/pump-set, he becomes unconscious and dies due to *asphyxia* (difficulty in respiration).

Safety cage/cover for tube wells: Safety cage for tube wells is made of wire mesh and is useful against falling of human and animals in wells. An opening at centre is provided for the delivery pipe of water lifting pump. A window is also provided for entrance in case of repair and maintenance.

CO₂ gas detection kit: This kit is cheap and economical and is made up of locally available material. In this kit a burning element *i.e.* a small piece of cotton soaked in



diesel is tied at the end of steel wire piece of about 2 feet length. The other end of steel wire is tied with a long cotton thread rolled over a small cylindrical stiff paper piece. It works on the principle that fire extinguishers at higher concentration of CO_2 . Before descending in a well, one can check presence of carbon dioxide gas by lighting

the cotton and lowering it slowly in the tubewell pit. *Poisonous gas sucking machine:* It is a tractor PTO operated machine that generates suction pressure in the inlet pipe to suck out poisonous gases from tubewell pits. A flexible PVC pipe, which acts as suction/inlet of the machine, is lowered into the tubewell pit.



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