M4-EN.8 SAFE USE OF EQUIPMENT

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Description of Chapter

In this chapter, all departments of textile manufacturing unit are developed together with practices of safe use. Finally, general directives of maintenance of mechanical equipment are presented.

Aim of the chapter is to familiarize all the involved parts with the Occupational Health and Safety in Textile Industry with the safe use of mechanical equipment.

M4-EN.8.1 Cotton ginning-Seed cotton feeding

In seed cotton feeding, intervention and the handling of suction hopper is particularly dangerous. Approaching can cause entrapment and serious injury. Suction is particularly powerful (there have been observed phenomena of suction of particularly heavy and bulky objects from the lorry) (M4.08.01).

Seed cotton feeding takes place in height, which requires experienced operators (quite difficult for seasonal workers) and all protective measures, as railings, non-slip floor, interruption buttons in frequently placed and PPE. While in most ginning houses the use of telescopic hoses takes place on the lorry, the existence of collective protective measures cannot be ensured and for this reason, the strict use of PPE together with training and supervision is very important.

In order to reduce exposure to risk, this work post should not be covered for eight hours' shift from the same worker but through job rotation.

M4-EN.8.2 Cotton ginning-Dispenser

It is not manned equipment and presence of workers is casual. In any case the speed of movement conveyor is particularly slow and it does not encompass particular risk for personnel, who can only seldom be found in this stage. Rolls of rolling conveyor should be covered and systems of direct interruption of operation should exist. Due to the bulky size of this machine a continuous wire system is proposed so that it is

accessible from workers that can be trapped anywhere (the absence of workers renders necessarily the possibility of interruption by the victim) (M4.08.02).

There should also be provisions for restriction of entry of persons in the conveyor machine. It is noticed that even with the conveyor's low speed there is still a risk that workers may fall in it, losing their senses. Something like that is difficult to be noticed, since the only regularly present worker in the warehouse is the operator of the derrick, who due to the nature of his work, it is difficult to notice it. This system is closed and not involving particular dangers during operation. The most important risks for safety occur during maintenance, since it includes sharp parts with non-negligible weight (gear wheels) that should relatively frequently be cleaned.

M4-EN.8.3 Cotton ginning-Separator, Feeder, Drier, Inclined cleaner

Separator, Feeder

Although the presence of an operator at this stage is not required, maintenance occurs in height and therefore suitable protective measures should be taken. Placement and maintenance of protective railings in good condition is required for prevention of falls of workers or objects falling on the workers.

It is a closed system from where cotton goes through without the direct intervention of worker. The risks during operation are limited but they are increased considerably at the maintenance process. (M4.08.03)

Drier

Risks during operation here are also limited, since human presence is particularly infrequent even for monitoring. The most important risks in this case occur during maintenance too. (M4.08.04)

Inclined cleaner

Inclined cleaner is placed in height. Since human presence is not necessary during operation, maintenance involves many risks due to height and density of parts that reduces accessibility and visibility. (M4.08.05)

M4-EN.8.4 Cotton ginning-Ginning machine

Ginning machine is one of few machines that require frequent presence of worker during operation. The worker optically checks proper feeding and smooth flow of cottonseed. Moreover, worker generally checks the smooth operation of machine. (M4.08.06)

Risks mainly concern entrapment and compression of upper lumps between moving rolls if the hand of worker that controls feeding enters deep where likely overdraft ginning rolls exist. New type machines usually have a system of detection with photocell in this point, or automatic mechanism of braking in case of entanglement of a big object (human limb compared to cotton) to stop the machine. Moreover, an automatic system of interruption of feeding should also exist in case that ginning rolls stopped.

Risks can be also be caused in cases that interlock systems that do not allow the operation of machine with open access in moved parts do not exist or have been

neutralized. In this case workers are exposed in moving parts and probably dangerous electric junctions and parts, particular in the event of careless movement or slipping towards the machine.

Ginning machines should allocate permanent bumpers that would deter the contact with the ginning saws while they are in moving. Blades of saws in the booth are considered sufficiently removed if they stand out from the ginning bars when the parapet is out of its place. Moving saws (in cleaners of fibres that have doors of access in the saws) should be covered with constant bumpers or proportional provision that would prohibit direct contact of hands or fingers with the saws when they are moving.

While ginning machines require continuous human presence, in most modern ginning houses there is a control room that allows sound insulation of operator most of the time of work, which decreases noise exposure, as well as the exposure in dust and fibres of cotton.

M4-EN.8.5 Cotton ginning-Air jet cleaner, Lint cleaner, Condenser

Air jet cleaner

Risks during operation are limited since presence of worker during operation is not required. The main risks concern the entry of hand deeply so that it reaches in the conveyor. It has been observed that in certain types of machines the conveyor is relatively accessible. Therefore, provision is proposed that would prohibit the contact with the conveyor in any case. (M4.08.07)

Lint cleaner

Neither in this instrument continuous presence of worker during operation is required. In any case, however constant barriers and interlock systems should be placed so that they stop operation when door is opened. (M4.08.08)

Concender

Workers' presence is not required. Risks appear only in during maintenance. (M4.08.09)

M4-EN.8.6 Cotton ginning-Press

The most important risks during press operation are the following:

- conflict with the piston or the surface of compression
- entrapment between wires and piston
- entanglement with wires and tying system

(M4.08.10)

Press requires the workers' presence and in particular continuous presence for three workers at least, who should also execute manual work. Concretely at minimal two of the workers should pass the wires that withhold the cotton ball before each ball. Their placement is a strainful and repetitive work. It involves the risk of worker being struck from the bent bars if they are not well supported, to slip in bars that are left in the floor or to cause accident due to bad co-ordination (two workers place

simultaneously the wires). The process is particularly strainful for the musculoskeletal system, since workers are usually forced to place the wires with time pressure and bending.

A particularly dangerous process for release of stressed wire to the worker is the moment at which the piston of press releases the parcel, which is left to be retained from the wires. If they are not well tied up the pressure can immediately release some wire violently to the worker. For this reason, the minimum distance of worker from the ball should be ensured. A provision of automatic locking should be placed in all ball-making machines so that they cannot open the doors for access while the piston is in use. The plates in the top of exporters should be closed and possibly equipped with a latch.

Another risk concerns the rotation of the press, particularly when the rotating apartment is not built completely under the floor. An automatic system should be placed that would not allow the rotation while worker is in the dangerous area, which should also be properly signalled. Additional sonic and luminous signalling should exist before rotation, while noise in whole plant is in particularly high levels. The operator of press should find himself always in place, at least during rotation. Another risk is the possibility of operation of the piston of the press while workers have not been yet removed. Therefore, special provisions like the one that is portrayed in the following picture (detector of weight) should exist so that no rotation or operation of press can take place while there is a worker in this point.

In some ginning houses the process of removal of a ball from the press becomes with pistons that prompts straight the ball on the conveyor, while in others this occurs manually. The manual handling includes risks of musculoskeletal disorders, while the dangers of possible worker blow in metal part of press from the release of mechanic energy (momentum) with the falling of the ball. (M4.08.11)

M4-EN.8.7 Cotton grinning-Bagging and Yarning-Openers, Cleaners-Mixed blenders

Cotton grinning-Bagging

It is another process with continuous presence of a worker. Proper systems (e.g. strings in the sides) should be placed to stop immediately the carriers in the event that somebody is trapped. Proportional provisions should also exist for pushers. Maintenance does not involve particular problems because of the simplicity that allows good visibility and accessibility. (M4.08.12)

Yarning-Openers

Automatic opener is usually used in new types of spinning machines. It scans a distance of few metres with particularly low speed, which decreases considerably the potential of entrapment or suddenness of worker during operation, since human presence is limited. (M4.08.13) Danger concerns entrapment in the gear wheels of opener assisted by the suction in this region) resulting to compression or injury. Frequent feeding of deposition line does not allow placing a constant barrier that would cover all its length. Therefore, any preventive measures should be limited in the area around the opener. A system of approach detection in safe distance (e.g. a photocell parametrically covering area of movement), which in the event of detection

stops immediately movement and suction. Alternatively, constant barriers can be placed that would follow openers' movement. (M4.08.14)

Cleaners-mixed blenders

They are closed arrangements where entry and exit can take place via a closed system of ventilators. Dangers concern in the maintenance process. (M4.08.15, M4.08.16, M4.08.17, M4.08.18)

M4-EN.8.8 Yarning-Cards

The nature of human work in cards is supervisory and corrective. The dangers during operation are relatively limited and they mainly concern the report in overdraft moved parts, which however are moving relatively slowly, as well as the danger of involuntary approach of human member in the particularly dangerous moving parts of the needles belt and the rolls. Therefore, constant barriers and systems of interruption of operation when a human limb enters should be placed in dangerous areas. (M4.08.19)

Another stage that includes important dangers during regular operation is the process of change of bucket, specifically when it happens manually. These dangers involve entrapment and compression in moving parts which are under approach. When the change of bucket happens manually it should be ensured that the external moving parts are covered with a constant barrier or with a system of detection of approach of human limb and an interruption button exists in a place that can be easily reached by the operator. It should also be ensured that there is enough space that allows the worker to move the buckets safely so that the probability to be entangled between buckets or a bucket and machine is decreased. Constant barriers that will not allow the worker to approach in the mechanism of buckets change when this is in use should be placed. Additionally systems that interrupt operation in case of entry of a worker's limb should exist.

M4-EN.8.9Yarning-Drawers, Combing preparation, Combers, Roving frames, Spinning frames

Drawers

Main danger during operation is the entanglement and compression of fingers mainly during cleaning, but also during operation from involuntary approach. Placement of transparent self secured cover that would not allow the operation when it is open is proposed. Important dangers also exist during the maintenance. (M4.08.20)

Combing preparation

The dangers in combing preparation machines are proportional to those of drawers, while in combing preparation, apart from fuse feeding, the remainder process is closed. The role of operator is clearly supervisory and mainly concerns the change of bucket of catering and the reunification of cut fuse. (M4.08.21)

Combers

The dangers during operation concern mainly the entanglement, entrapment and compression of upper limbs of workers in the overdraft rolls of comber. Therefore it

is proposed to place constant barriers and where this is not possible systems with photocell that would detect any possible approach of human limbs. A dangerous work that could lead to approach of human limbs to the moving parts is the initial passage and cleaning from fibres and dirt that are gathered in the rolls. The most important dangers however, concerns maintenance. (M4.08.22)

Roving frames

Dangers are also limited in this case and the role of worker is supervisory. They are in effect the same with those of the combing preparation machine, except transport in the next stage, which is usually automatically conducted. (M4.08.23)

Spinning frames

Human intervention of operator concerns interventions in the stopped spindles and heads, cleaning, etc. The most important danger concerns entrapment and finger's injuries and slipping and fall in the sharp and rotating parts because of the limitations in space and lack of comfort because of noise and clouds of pendulous cotton fibres.

M4-EN.8.10 Spinning-Winding frames and Weaving-Warping frames, Lustring

Winding frames

The dangers from the use of winding frames are limited. Moving arms can injure fingers that will approach near to the point of reconnection, even if this case of approach is considered rare. There is always the risk of a potential slip and fall of the worker in this area. Another problem for winding frames is the limited space that increases the concentration of hazardous factors and the probability of slipping. Complete exploitation of available space and provisions for safe vertical crossing in winding frames should be achieved. (M4.08.24)

Warping frames

Main danger concerns intervention before the moving parts are immobilised completely. It is proposed to place constant (where possible) barriers or provisions of detection of approach of limb that would automatically stop the operation, at least in the roll where this is feasible. In the most modern warping frames, the machine closes automatically from all sides before it begins, as it is portrayed in the pictures. The most important dangers concern maintenance. (M4.08.25)

Lusting

Operator's presence is not required. Dangers during operation concern the placement and removal of warp rolls before and after lusting, which should be as possibly mechanized and the operator should continuously have absolute control of the process and to be possible for him to interrupt it safely. The most important dangers concern maintenance. (M4.08.26)

M4-EN.8.11 Weaving - Looms

Irrespectively of the type of loom, dangers are almost the same. In the modern looms, continuous presence of operator is not necessary. On the contrary, lamps of different colour exist that call operator to intervene. (M4.08.27)

The interventions concern mainly disengagements, cleanings and small corrective tasks. Danger for entanglement and fingers compression exists in rotating or sharp part. This danger is increased by the lack of visibility and balance in certain cases, which also increases the danger of fall.

In any case what should exist is a system that would not allow the movement when worker approaches a dangerous point and slow movement to be imposed until they are found in a safe distance. This can be achieved with time delaying or with requirement of a second activation of system in order to reach complete power.

The first solution is proposed, because with workers get used to the solution of double activation, so that it loses its effectiveness. The situation from musculoskeletal point of view is awkward (long standing) and the placement of special seats and the reception of organisational measures (breaks) are proposed.