

MACHINERY SAFETY INFORMATION CABLE STRIPPERS

This WISH information document is aimed at health and safety improvements in the waste management industry. The Health and Safety Executive (HSE) provided support to WISH in producing this advice. This advice may go further than the minimum you need to do to comply with the law with regard to health and safety

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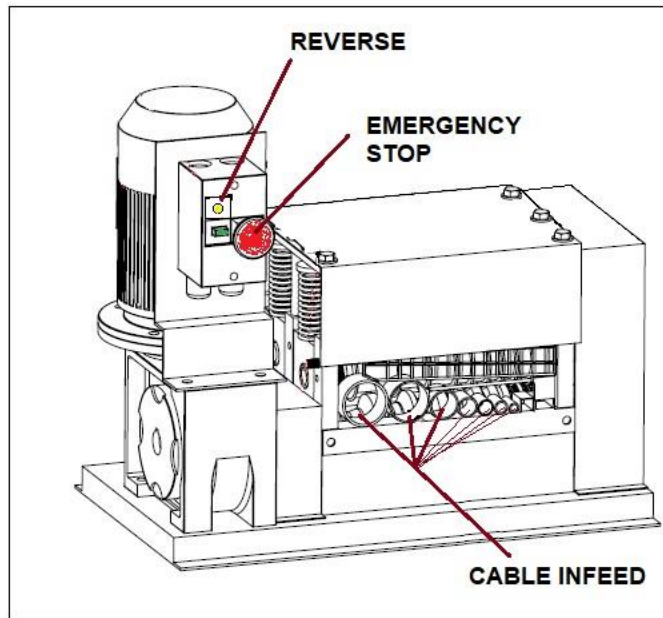
This is one of a series of sheets covering specific items of machinery in use at waste recycling plants/MRFs and similar. All of the sheets are available as free downloads from the WISH website at <https://www.wishforum.org.uk/information/>. In addition, specific machinery isolation and lock-off advice is available at [WASTE 29](#) and overarching waste and recycling machinery safety advice at [WASTE 33](#). This sheet does not aim to be comprehensive – you should also seek further guidance, such as from the HSE's website, and where required obtain competent advice. This sheet primarily covers the machinery hazards and risks associated with cable strippers. Please note that this sheet does not cover non-machinery risks, such as manual handling, and you should conduct assessments to ensure you have identified all risks.

Tips, discussions, case studies, and notes – in WISH documents tips, discussions, case studies, and notes are sometimes provided in green tint boxes. Tips, discussions, and case studies are informal advice, experience, and ideas aimed at helping operators manage risk. They are not part of formal advice. Notes expand on specific issues, give clarification, highlight issues, and provide explanations. Notes are part of formal advice.

Introduction

Contact with the moving parts of machinery, including cable strippers, has been the cause of many serious accidents at waste recycling and similar plants. The safe design, use and maintenance of machinery such as cable strippers is essential if we are to reduce this unacceptable toll of serious accidents.

Cable strippers are used to remove the outer plastic, or similar, insulating sheath from electrical cabling to reveal the inner, typically copper, core. Cable strippers are in common use at metals recycling plants but can also be found at construction waste and similar sites which receive wastes including cabling. Strippers include feed and output points, and controls such as start/ stop, emergency stop and often a reverse switch. They are either powered via electric motor or hydraulic drive. The diagram below shows a typical stripper.

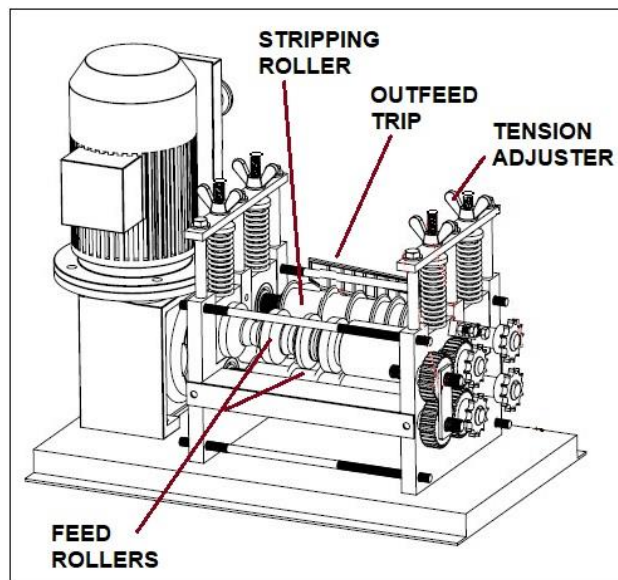


Note – typically, cable strippers are relatively small compared to other recycling machinery, such as balers, conveyors etc. They are available from a variety of suppliers, including online, unlike many larger items of recycling machinery which are only usually available via specialist suppliers. Experience is that a significant proportion of cable strippers available through non-specialised suppliers and/or online may not have been manufactured in the UK and/or the EU. As a result, they may not comply with required machinery safety standards. You should be aware of this and may need to seek specialist advice before purchasing. **Do not assume machines purchased online will meet all relevant standards.**

Dangerous parts of cable strippers

Cables are pulled into the stripper usually via a set of feed rollers which draw the cable through appropriately sized grooves along the length of the feed rollers. Behind the feed rollers there is usually a stripping roller which slits/scores the outer insulation sheath and flares the sheathing to allow separation of the outer from the copper or similar inner cable.

Typically, the tension between the various rollers can be adjusted, depending on the cable core diameter, outer sheath material and cable thickness. A typical arrangement of these components is shown in the diagram below (note – guards not shown).



The obvious danger zones are the rollers and their in-running nip points, and/or the 'blades' on the stripping roller. Contact with the feed and stripping rollers is likely to cause crushing, laceration, or amputation of fingers and/or fingertips. Access to danger zones may be from the feed side, or from the output area (dependent on the quality of guarding provided access may also be possible from above and/or underneath the rollers – such access is not considered in this sheet, and for information employers should consult WISH WASTE 33 on the principles of safeguarding for recycling and recovery machinery, available at [WASTE 33](#)).

Cable strippers may also have other danger zones, e.g. from the drive mechanisms. These must be adequately safeguarded but are not considered in this information sheet. As above, employers should consult WISH WASTE 33. Eye and hand injury is also foreseeable because of the potential for cable to 'whip' or contain sharp projections, such as wire or reinforcement strands. Hand and eye protection should be worn, and loose clothing avoided.

Safeguarding of cable strippers

Cable strippers can differ in their design, although most are similar in their general operation. The safeguarding advice given below covers the primary hazards and is not intended to be comprehensive: you need to look at your cable stripper and consider the need for access, both during normal operation and interventions, such as clearing blockages/jams and cleaning. For interventions where operators may come into contact with the dangerous parts, a robust system to isolate and lock-off the machine is vital – see [WASTE 29](#) for detail.

Access from feed side of stripper

Safeguarding at the feed side is typically provided by a fixed guard with a series of different-sized holes in it. This allows different diameters of cable to be fed via the appropriate size hole. Or, in some cases strippers have a series of individual removable guards each with a single feed hole: the hole in each removable guard being different. The removable guard with the appropriate size hole for the diameter of cable to be stripped is selected and fixed to the machine. If a different diameter cable is to be stripped the guard is removed and replaced with another with the appropriate size hole for the different diameter cable. Removable guards should not be fixed with 'thumb/wing nuts' etc – they are fixed guards, their removal should require a tool, key or similar, and should only be carried-out under isolation/lock-off.

Whichever system is in place, workers should use the correct size hole for the cable they are stripping. There can be a strong temptation for workers to just use the largest size hole, for reasons of convenience (or where removable guards are fitted simply leave the guard with the largest hole in place all the time). Employers should be aware of this foreseeable misuse and include it in their monitoring and checking and inspection regimes.

On some cable strippers the holes in guards at the feed point are fitted with tubes. Provided that the correct size hole/tube is used these can be useful in that they can restrict the cable from bending and so allow better alignment with feed rollers. Different length tubes can also be used: shorter tubes for smaller feed holes, longer tubes for larger feed holes, while still complying with the 'openings in guards' requirements noted above. This may mean that the 'delivery/inner end' of the tube can be placed closer to the feed roller so assisting alignment. However, the same requirements and foreseeable misuse issues as above still apply.

Because of the way cable strippers work, a high reliance remains on feeding the correct length of diameter of cable, matched to the size of the opening necessary to grip and then draw the remaining cable into the stripping jaws. If the cable is too short to be gripped by the jaws no attempt should be made to push it through.

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However, the further away from the guard the feed roller is, the more difficult it may be to insert cable accurately – the cable may bend and ‘miss’ the feed roller. This can lead to workers attempting to push cable through the feed hole with their fingers; use a ‘push-stick’, or a hooked tool from the output side of the stripper to align the cable onto its feed roller etc; or where a removable guard is fitted simply leave the guard off. These methods should not be used. If the cable cannot be drawn in by the machine correctly it should be discarded.

It is therefore important for employers to be aware when purchasing a new cable stripper (or assessing an existing machine) that the cable lengths and diameters it is anticipated will be fed into the machine are key factors when considering and selecting the design, size and suitability of the stripper. The distance from the feed point/hole in the fixed guard to the roller nip-points with the correct sized cable inserted being compliant with standards such as BS EN ISO 13857 while still allowing the machine to grip the cable and draw it in. Achieving this balance should be part of your risk assessment.

Some cable strippers have a Perspex, or similar, ‘viewing panel’ in the fixed guard at the cable feed openings. This type of arrangement can assist workers when feeding cable into the machine – they can see if the cable has engaged correctly onto the rollers. However, such vision panels can become scratched or otherwise damaged over time and may need periodic replacement to remain effective.

Note – because of the issues noted above, the safe operation of cable strippers may rely more heavily on adequate and effective information, instruction, training, supervision, and monitoring than many other types of recycling and recovery machinery:

Information – so that workers are fully aware of the risks posed and how to avoid them

Instruction – on safe ways of working and that foreseeable misuse such as trying to ‘prod’ cable through feed openings with fingers, push sticks, feeding cable from the output area of the stripper etc is not acceptable

Training – in the safe operation of the machine, procedures for clearing jams etc, safe isolation and lock-off processes etc

Supervision and monitoring – to ensure that cable strippers are used correctly and safely, that cable size is always matched to the appropriate feed opening etc, and that where misuse is observed that appropriate action is taken to avoid any recurrence

Access from output side of stripper

Once the cable has been stripped the inner core and the stripped outer insulation need to exit the machine, usually to the rear of the stripper. Output areas should be guarded to ensure there is no access to danger zones. While the rollers may present an 'out-running' nip, they usually include blades or similar which can still cause injury. Plus, most strippers have a reverse function which means the out-running nip can become an in-running one (see below).

Guarding at the output area is typically provided by fixed guarding. This can be a 'gridded', mesh or similar guard which allows the cable to exit but prevents human access, or a 'tunnel guard' which achieves the same outcome. Whichever approach is used, the distance and size requirements for openings in the output-side guards should still achieve safety distances in standards such as BS EN ISO 13857.

The guards themselves may cause jams. If this is an issue, then different forms of fixed guarding should be considered before moving to alternative safeguarding measures. For example, if a gridded guard is causing an issue, then consideration should be given to an alternative such as a tunnel guard. Machines should always be isolated before attempting to clear blockages, jams etc (see section below).

On some strippers the output area has a 'trip bar'. Contact with the bar causes the machine to stop. Trip bars are commonly fitted and are considered a type of emergency stop, they should not be used as a safeguard option – they can be used as a supplementary measure to guards but not as a replacement.

Reverse function

Many cable strippers have a reverse function which reverses the rotation of the machine's rollers. This is aimed at releasing cable which may have become jammed during infeed or stripping. Cable strippers should **only** be operated from the infeed side of the machine.

One form of foreseeable misuse is to use the stripper in reverse and feed cable back through the machine from the output area. This is often done when cable does not fully strip and requires re-feeding, such as because of worn blades. This is not an acceptable practice and often involves two workers, one at each side of the machine. Employers should be aware of this foreseeable misuse and include it in their monitoring and checking and inspection regimes. Reverse functions should be configured as 'hold-to-run' – that is the reverse button/switch needs to be held in the 'on' position and once released the machine reverts to normal operation.

Emergency stop provision

At least one emergency stop should be fitted to cable strippers, not including any trip-bar installed at the output area. This should be at least located at the input area and easily accessible by a worker feeding cable into the machine. Larger cable strippers may require more than one emergency stop – this is a matter for risk assessment. Experience is that some cable strippers manufactured outside of the UK/EU may not be fitted with an emergency stop. While this is rare, employers should be aware of this issue.



Left to right: two examples of three-phase sockets fitted with isolation switches and three examples of lockable plug caps (see section below on safe access and blockage/jam clearance and isolation and lock-off)

Safe access and blockage/jam clearance

The majority of serious machinery accidents occur during 'interventions' such as cleaning, repeated re-feeding to fully strip cable sheathing, blockage/jam clearance etc. Clearing jammed cable from rollers is a particular risk. The key to avoiding such accidents is adequate isolation/lock-off during interventions – see WISH guidance WASTE 29 'Practical guidance on secure isolation (lock-off) for recycling and recovery machinery' available at [WASTE 29](#).

The more frequently a machine requires intervention, such as to clear jammed cable from a stripper, the greater the likelihood of an accident occurring. Where repeated interventions like this are necessary, you should consider the following:

- Is this the correct machine for the job? For example, attempting to strip a cable of a larger diameter than your cable stripper can handle safely is likely to result in more jammed cables and a greater need to clear jams
- Is your maintenance appropriate? For example, replace worn stripping blades/rollers before they are worn-out – the more worn blades/rollers are the more likely that cable will jam and the more frequently jams will need to be cleared
- Is the roller tension adjusted correctly? Most cable strippers have adjusters for roller tension (see diagram above). If roller tension is too loose or too tight the more likely it is that jams will occur and the more frequently jams will need to be cleared

Access to cable strippers is usually fairly easy. However, for general advice on access for interventions see WISH guidance WASTE 13 'Safe design and operation of materials recovery facilities' available at: [WASTE 13](#) and in the WISH guidance WASTE 33 'Principles of machinery safety – recycling & recovery plants' available at: [WASTE 33](#).

Note – Cable strippers are usually smaller than other types of recycling and recovery machinery. As a result, while some cable strippers are 'hard-wired' into their power supply others are 'plugged-in', typically into a 'three-phase' supply via a socket. In some cases, the three-phase socket is fitted with an isolation switch (see example photographs above). For hard-wired machines and for sockets fitted with an isolation switch the detail in WASTE 29 on isolation and lock-off relating to isolation switches applies. For sockets not fitted with an isolation switch, other means of isolation may be required such as the use of lockable plug caps (see example photographs above). In all cases isolation and lock-off must be effective and comply with the standards contained in WASTE 29.

Disclaimer and WISH

This information document has been prepared by health and safety practitioners to assist health and safety improvements in the waste management industry. It is endorsed by the WISH (Waste Industry Safety and Health) Forum. This information document is not formal guidance and represents good practice, which typically goes beyond the strict requirements of health and safety law.

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This information document is not a substitute for duty holder and/or professional safety advisor's judgment. Notwithstanding the good practice in this document, duty holders are responsible for ascertaining the sufficiency and adequacy of their internal and independent procedures for verifying and evaluating their organisation's compliance with safety law.

The Waste Industry Safety and Health (WISH) Forum exists to communicate and consult with key stakeholders, including local and national government bodies, equipment manufacturers, trade associations, professional associations, and trade unions. The aim of WISH is to identify, devise and promote activities to improve industry health and safety performance.

Useful links and further reading

WISH website: <https://www.wishforum.org.uk/>

HSE waste and recycling webpages: www.hse.gov.uk/waste/index.htm

BS 14100:2020 - Control of hazardous energy on machinery

BS 14200:2023 – Maintenance of machinery

WASTE 13 'Safe design and operation of MRFs'

WASTE 29 'Practical guidance on isolation (lock-off) for recycling and recovery machinery'

WASTE 33 'Principles of safeguarding for recycling and recovery machinery'

There are also dozens of EN and similar technical standards on machinery safety. You as an operator are unlikely to have access to all of these and would not be expected to have an in-depth knowledge of them. However, you should have access to competent advice which does have access and the required knowledge.