THE PENNSYLVANIA RAILROAD COMPANY

SAFETY

HINTS AND SUGGESTIONS

FOR THE PREVENTION OF PERSONAL INJURY ACCIDENTS

AWARDED BY THE AMERICAN MUSEUM OF SAFETY

TO

THE PENNSYLVANIA RAILROAD COMPANY

FOR ITS EFFORTS IN CONSERVING
THE LIVES AND LIMBS OF ITS EMPLOYEES

"The problem of safety is not altogether a question of rules and their enforcement, safety appliances and their application, but the development of inherent self-restraint and control."—*Address, W. W. ATTERBURY, Vice-President The Pennsylvania Railroad Company, to Members of American Museum of Safety.*

TO EMPLOYES OF THE PENNSYLVANIA RAILROAD COMPANY

The accompanying general suggestions have been prepared for the guidance of Safety Committees in reporting on road, yard and shop conditions, with a view of standardizing methods and practices and to secure uniformity in the recommendations for correcting dangerous conditions and practices.

As the safety movement affects in some degree more than 140,000 employes, the suggestions have been prepared in pamphlet form that there may be intelligent co-operation along all lines of safety effort, and an urgent appeal is made to each employe for active support and co-operation, without which many unnecessary accidents causing loss of life or limb will continue to occur.

The safety work inaugurated more than two years ago originated in the belief that the great majority of railroad accidents are due to causes readily preventable,—in most cases within control of the men themselves. Investigation shows that of every five injuries occurring, three are preventable by the observance of some simple precaution or rule.

Since the inception of the safety movement, large expenditures have been made for safety appliances and in safeguarding and improving working conditions generally. In making these expenditures the Company has given convincing proof of its active interest, but it should be remembered that the money spent in safeguarding conditions will not reach more than one-third of the accidents, the remainder being due to carelessness and improper methods of work, which no safeguard or mechanical device will prevent.

Recognizing the importance of having the men actively participate in the work, Safety Committees have been organized on all divisions,–in addition the Company also desires that any condition or practice involving risk of personal injury be reported to the proper officer or member of the Safety Committee.

The business of transportation requires that more than ordinary precaution shall be taken to safeguard operation from accidents, and while in all railroad operations the safety of passengers is the first consideration, the problems presented in protecting its employes in many respects are identical, and in safeguarding the latter, the safety of the public is also largely secured.

Safety in railroad operation is not a question of safeguards, but of intelligent caution constantly exercised. Notwithstanding that in no other country have appliances for safeguarding railroad transportation been so highly developed, the number of accidents reported each year shows a continued increase for which it is difficult to account, except on the grounds of carelessness or neglect on the part of some of the employes themselves and the ultimate aim of the safety work is to develop in each employe a sense of personal responsibility, not alone in taking measures for his own safety but for that of his fellow employe as well. It is the duty of every man not only to use his best endeavors to prevent accidents by utilizing safety devices himself and watching that they are kept in first class working order, by carrying out strictly all orders looking to prevention of accidents, but it is his duty to himself as well as to his fellow workman to keep others from danger through negligence, ignorance and recklessness. It is important to remember that men taking chances not only endanger their own lives but frequently expose others to danger.

In correcting defective conditions the Company desires that every reasonable precaution be taken to insure safety and will carefully consider any practical suggestion made

by any of its employes tending to promote safety. Safety is fundamentally a habit of mind which may be acquired by all, through the exercise of ordinary caution and forethought in the small details of everyday duties.

During the past two years the Company has adopted the policy that all tools and machines purchased are required to be fully protected by the manufacturer with the necessary guards to insure the maximum of safety in their operation,–in addition approved guards are being applied to practically all machines now in service. Contrary to the opinion sometimes expressed, the introduction of machine guards does not appreciably retard or diminish output,–the presence of a guard affords greater confidence on the part of the operator working around machinery allowing greater freedom of effort which will result in increased efficiency.

Approved:

May 1st, 1913

S. C. LONG,
General Manager.

GENERAL SUGGESTIONS FOR ROAD AND YARD SAFETY COMMITTEES

As an aid to Safety Committees an outline of the various features for consideration is given herewith, covering in detail conditions which are more or less common to all Divisions, and which are mostly responsible for the large number of railroad accidents. In addition to the subjects noted there will be found on each Division other conditions to which careful attention should be given. While it may not be practicable to apply the suggestions made in all cases, which will depend to a large extent on local conditions, to which careful consideration should be given, as a rule they will indicate in a general way the proper remedy or safeguard.

RIGHT-OF-WAY
INCLUDING RIGHT-OF-WAY STRUCTURES

Bridges:

At points where employes' duties require them frequently to cross, bridges may in many instances be safeguarded by providing a footway on one side with railing extending the entire length of the bridge,—excepting for bridges of the half-through type. Double track bridges (excluding half-through) should have walk in center between tracks–on other two- and four-track bridges than those specified, consideration should be given to footway and railing on both sides.

For the protection of trainmen riding on top of box cars, head tappers should be provided on both sides of all overhead bridges when the clearance between the underside of bridge and top of rail is less than twenty (20) feet nine (9) inches.

Clearances:

Under this heading Committees should consider the location of all buildings, objects or obstructions which by reason of their nearness to track or right-of-way would endanger the lives of employes or passengers.

Scrap and material piled on right-of-way too close to track.
Scale Houses.
Standpipes between tracks.
Limbs of trees.
Abutments of overhead bridges.
Coal Bins and siding fences.
Pole Lines, wires and cross-arms.
Locomotive entrances to Round Houses.
Rock Cuts.
Cattle Guards.
Cars on sidings adjacent to main running tracks.

Particular attention should be given to roofs where the overhang would fail to clear men on box cars; examination should also be made to insure that proper clearances are provided at sheds and other buildings on sidings. Where for any reason it is found impracticable to provide the required clearances, special instructions should be issued to employes or crews working at such points.

Coal Falling from Engines or Cars:

Attention should be called to improperly loaded engine tenders or cars to prevent coal falling on right-of-way while in motion. Employes are cautioned against the practice of throwing clinkers or cinders from moving engines.

Coal Wharves:

For unenclosed wharves where employes would be exposed to falling from inclines or top of wharves, footways and hand railings should be considered. When covered with ice, walks, steps and inclines should be kept sanded.

Culverts:

In yards and at points where employes' duties require them frequently to cross, all arches, culverts and retaining walls within nine (9) feet of track should be provided with footways and railings. Open culverts may be safeguarded by placing iron gratings and screens over openings.

Ditches:

Cross-ditches as a rule should be covered; particular attention should be given to open ditches near sidings and stations and at points where shifting is done.

Doors:

As a general rule doors should be hung to open outwards except where doors open directly onto tracks. At doorways opening onto tracks it may be advisable, in addition to providing a warning sign inside and outside of the doorway, to provide a swinging safety gate painted in red with word "Danger" lettered conspicuously on crossbar, or a guard rail enclosure immediately outside of door. Where dangerous conditions exist at night the necessity for an illuminated sign should be considered.

For doors in passageways swinging in both directions, the upper portion should contain a glass panel the lower edge thereof to be approximately 48″ from floor line.

Embankments:

Committees should note generally conditions of embankments and points where there is danger of slides and of rocks or trees falling on right-of-way. At points where watchmen are employed to give warning of slides, consideration should be given to recommendation for portable watchmen's clocks, to insure faithfulness.

Foot Guards:

In all tracks where frogs, guard rails and switch points are not equipped with standard spring foot guards or other foot protection, attention should be drawn to same so that instructions can be given to track foremen to see that proper protection is provided.

Highway Grade Crossings:

All crossings should be carefully examined to see that the view of foot travelers and drivers in approaching the crossing is not obstructed by trees, poles, hedges, Company's tool houses or other buildings. Consideration should be given to condition of crossing planks and other features to insure safety. Where safety gates have been provided they should extend over the sidewalks in addition to the roadway.

Ice Hazards:

Conditions should be carefully noted at all buildings where there is danger of ice forming on sidewalks and station platforms due to water dripping from roofs. Ice noted on walks or platforms should be reported and until removed should be kept sanded.

Lighting:

Apparently improper or inadequate lighting at stations, station platforms, stairways or buildings should be noted by Committees and attention called to inadequate facilities.

Obstructions Around Tracks:

Conditions should be carefully observed with reference to the presence of signal wires and rods across right-of-way; wherever possible they should be protected to prevent employes stumbling or tripping over same.

The presence of air and water valves, taps and piping above ground in yards is in some instances dangerous, and

should be noted by Committees and recommendations made for improvement wherever practicable,—generally air piping can be safely installed by placing the lines close to track rail.

Couplers and scrap material lying between tracks or close to tracks should be promptly removed by trackmen.

Car repairmen and engine-house employes should not permit scrap or unused material to lie close to tracks, and all tools should be returned to their proper places.

Planks and Kindlings:

All boards found in yards or on right-of-way containing spikes or nails should be removed; where they are necessary in connection with repair or other work, the protruding nails or spikes should be turned downward.

Station Platforms:

Station platforms should not be less than the standard distance from rail line; examination of conditions of platforms and curbing should be made by the Committees and criticisms or suggestions offered where necessary. Where traffic warrants, station platforms should be made sufficiently long to accommodate all cars regularly using the station, particularly at points where passengers descending from cars are exposed to falling into open ditches, or to other dangerous conditions. Where raised platforms are provided to facilitate the unloading of freight and baggage, the standard distance from rail should be maintained.

Signal Bridges:

Where lower decks of signal bridges are open (unfloored), the question of providing a footway for signalmen should be considered, as shown on standard M. W. Tracing No. 60325.

Ties and Material Around Tracks:

Where ties or other material piled by sectionmen are found lying on right-of-way near tracks, Committees should

make report thereof, together with recommendations where there would be danger to employes. Right-of-way, particularly foot paths beside tracks, should be kept free of broken draw bars, lumps of coal and similar obstacles.

Track Fences:

In districts of heavy suburban travel, and at other points where traffic conditions warrant, consideration should be given to necessity for track fences at stations, particularly where three or more main running tracks are operated. Fences should, as a rule, be extended well beyond the ends of station platforms.

Turntables:

At many points conditions may be safeguarded by providing a railing across walks on the side of the table,—also rules relating to safety practices in connection with operation of turntables should be posted in cab. Committees should note points where turntables are used as thoroughfares.

Water Tanks:

As a rule tanks should be provided with hand rails and grab irons on trap door openings.

OPERATION

Baggage Trucks:

At all stations, when not in use, trucks should be secured or placed as to prevent truck rolling toward tracks, and trucks kept where they will not be in the way of patrons.

Blue Flags and Blue Lights:

Committees should note whether blue flag and light protection is used in accordance with Book of Rules.

Book of Rules:

An important function of Safety Committees should be to report any violation of the "Book of Rules" and to make such recommendations as may seem practicable to insure more careful observance thereof.

Bumping Blocks:

Bumping blocks of some type, as a rule, are advisable for blind sidings where public highways or buildings are exposed.

Coupling Cars:

Report should be made of all instances where employes stand between moving cars to make coupling. The practice of going between slowly moving cars to couple air hose or to kick over coupler should be discontinued.

Cranes:

Loading cranes, at stations and in yards should be locked in a safe position to prevent swinging across tracks, and all exposed parts protected with approved guards. They should be inspected periodically and the result of the inspection should be recorded.

Derails:

On sidings with grade descending toward main tracks, the question of providing derail protection should be considered.

Signals:

Attention should be given to trees or other objects along right-of-way obstructing the view by trainmen of track signals.

Unloading Ties, Rails and Other Material:

Many accidents resulting in injuries to feet and hands, including strains, are due to this cause. The Committees

should call attention to any cases coming to their notice where such accidents are liable to result, with any suggestions for prevention which they may be able to make.

In all lifting operations, Foremen and Gang Leaders should be careful to see that in each movement the men act in unison, both in taking hold and letting go, in dropping or placing the "load."

For loading and unloading operations where trucking is necessary, including work at Freight and Transfer Stations, a standard type transfer plate should be provided.

Warning Signals:

Where trains are run backwards, Committees should note if backing-up whistles are provided, and also whether they are sounded in approaching all crossings. All track foremen should be provided with whistles to warn trackmen of approaching trains.

Warning Signs:

The necessity for warning signs should be noted at:

Road crossings.

Engine House Tunnels.

Buildings situated close to tracks with doorways opening thereon.

Switchboards, and at other points where electrical conductors are exposed, carrying high voltages.

NOTE: To meet special conditions it may be necessary to provide signs in foreign languages.

UNSAFE PRACTICES

In going over the road, Committees should be careful to note points where tools left by trackmen or others foul the track, also cases where firemen on engines allow hooks or scrapers to project beyond side of tank.

Where trainmen or members of yard crews are found standing between the rails in mounting footboard of approaching engines.

The practice of employes climbing between cars in crossing yards going to and from their employment is more or less a frequent cause of accident,—employes should use road crossings or bridges where same are provided or cross at open ends of yards.

Trainmen are particularly cautioned as to the necessity for care in getting on and off moving cars and engines; to see that they have secure hold on grab-irons and hand-holds, and to make sure that there is safe footing in alighting, especially to avoid stepping on coal or stray pieces of ballast.

Engine bell should be rung at all times when engine is about to move. Enginemen, Engine Preparers and other roundhouse employes are especially cautioned to carefully observe this rule when engines are on inspection pits and on pits in Engine House.

Report should be made wherever freight cars are found with wires dangling, which have been used for binding loads. Car Inspectors and Agents should promptly remove these wires after unloading.

Boards and blocks with nails protruding, removed from behind car doors, should not be carelessly thrown on the ground where they may be stepped upon by trainmen and others.

Trackmen and others working about tracks should, whenever practicable, face the current of traffic, and on the approach of a train must move to a place of safety. Where approaching trains cannot readily be seen because of permanent obstructions to view, or temporary obstructions such as fog, storms, snow or engines or cars, extra precautions must be taken to warn the men of approaching trains. Foremen should see that this rule is carefully followed.

Watchmen, patrolmen, track walkers and others on duty which makes it necessary for them to be on track, where there are two or more tracks should, when practicable, travel against the current of traffic keeping a sharp lookout in both directions for approaching trains. The practice of walking upon tracks except in performance of duty is forbidden.

The use of tools with burred heads should be avoided. Employes must examine and know for themselves that tools and materials which they make use of are in proper condition. Track Foremen should regularly inspect sledges, spike mauls and rail cutters to see that they are free from burr, and that all tool handles are securely wedged, report of this inspection to be sent to Supervisor monthly.

Foremen and Gang Leaders should take particular care to insure that all safety rules and regulations are thoroughly understood by the men working under them,-where any of the men are unable to read English the nature of this pamphlet should be carefully explained.

Employes should also avoid the following dangerous practices:

Reaching under a car coupling instead of over it, when one car is equipped with outside sill.

Going between cabin car and footboard of helping engine to uncouple air while train is in motion.

Swinging between cars while in motion and kicking air hose to stop leakage of air.

When helping engines are coupled to cabin cars, with air cut in on the helping engine,—train should be brought to a stop to permit uncoupling of air hose and turning of angle cock on engine.

Enginemen, firemen and engine-house employes should give special attention to see that the coal sprinkling hose is in good condition and properly attached to pipe; also that due care is exercised in using cylinder cocks to prevent escaping steam injuring employes and others. In the use of gauge cocks it should be known that they are in good condition.

ELECTRICAL

In view of the increasing use of electricity every reasonable precaution should be taken to safeguard the hazard in connection therewith. Among other safeguards the following should be considered:

Wood slats or rubber mats at switchboards, transformers and other places as may be required.

Rubber mats at commutator end on generator sets.

Provision for protection of arc lamp trimmers by having locks or signs for switches.

Suitable overhead platforms for use of trimmers and electricians.

That all exposed switches and conductors carrying over 440 volts be indicated by danger signs.

TRANSPORTATION

At freight and transfer stations Safety Committees should note any lack of care in loading and handling of explosives and other hazardous ladings, including the method of packing and placement in cars and proper labeling of shipments, and see that the rules of the Transportation Department and Interstate Commerce Commission are carefully followed.

SANITARY CONDITIONS

Drinking Cups:

Committees should report at each point practical measures for overcoming the use of common drinking cups and the substitution of individual sanitary cups; also at some points sanitary "bubble" fountains may be desirable. Wooden water casks elevated at proper height having sanitary drinking faucet may also be used to advantage.

At shops and other points provision for individual wash basins may be found desirable, and Committees should investigate this feature.

Toilets:

Toilets should be regularly disinfected. Closets over vaults should have ventilating pipes and seat covers,—vent-pipe to extend below surface of seat.

To prevent urinals becoming clogged, it is suggested that a removable small mesh wire screen be provided immediately inside of bowl.

As far as possible the use of newspapers or heavy waste paper in toilets should be prohibited, and ordinary toilet paper provided.

In car yards and at other points unsanitary conditions may be found due to the absence of toilet facilities for yardmen and crews,—of which report should be made.

HYGIENE

Hygiene involves, among other features, provision for pure air, proper lighting and good water, and Committees are instructed to give consideration to these features and report thereon where unfavorable conditions are found.

FIRST AID

As far as possible all employes should be instructed in giving first aid relief. Arrangements have been made for lectures on this subject by Relief Department Doctors or Company Surgeons, and attendance of all men should be made compulsory.

First aid equipment consisting of stretcher, blanket and two first aid boxes should be provided generally at stations, telegraph towers, yard buildings and tool houses when directed. These equipments should be readily available at each point.

Wreck trains should be inspected to see that stretchers, blankets and a complete medical box equipment are provided.

TRESPASSING

In order to reduce the large number of fatalities due to this practice, the Company has been making every effort to patrol the right-of-way and to have local laws and ordinances enforced prohibiting the practice. Safety Committees should indicate points where "No Trespassing" signs should be provided, and be especially vigilant in reporting all points where trespassing is noted or is known to be the practice, and should carefully consider means and measures that may be effective in overcoming this practice.

When enginemen find persons trespassing, warning signals should always be given in time to permit their reaching place of safety.

In localities where children attending school make a practice of using right-of-way or otherwise trespassing, it may be possible to enlist the co-operation of the school authorities in warning the children, and by posting notices calling attention to the danger.

GENERAL SUGGESTIONS FOR SAFEGUARDING MACHINERY AND SHOP CONDITIONS, APPLICABLE TO ALL PLANTS

Most shop accidents are due to carelessness and disregard of shop rules. In providing protection for exposed machinery and in improving conditions in order that all shop employment may be safeguarded, it is expected that each man will do his part in seeing that guards are properly used and by co-operating with the Company, not alone in carefully observing all safety rules, but in reporting every unsafe condition to the Foreman or to some member of the Safety Committee.

In their recommendations for the application of guards and other safety devices, Committees should consider local conditions in each case in determining the danger, and the necessity for a safeguard.

The following guards and safety precautions specified are not intended as standards but for the guidance of Safety Committees, by directing attention to dangerous conditions and also indicating in a general way the proper remedy or safeguard.

Air Hoists:

Thorough inspection, both internally and externally to be made when piston packing is renewed. Each hoist to be numbered and record of inspection made for filing.

Report should be made where plunger rods are found too short, allowing swivel hook to jam against stuffing box nuts. There should be a clearance of one and one-half (1½) inches to prevent accidental amputation of fingers. Attention should also be given to plunger or piston fastening and to valves.

Belt and Pulley Guards:

For protection of belts and pulleys near floor line a double railing is considered advisable, thirty-six (36) inches high, of one and one-fourth (1¼) inch pipe secured to floor by sockets.

In some cases a heavy wire screen metal cover should be attached to railing, particularly where the machinery is congested.

Belt Shifters:

Belt shifters suspended overhead to be arranged to hang vertically when belt is on the loose pulley.

Belting:

The use of belt hooks, clips and wire lacing introduces an unnecessary hazard. Glued splices or rawhide lacing are preferable.

Boring Mills:

Mills fitted with wheel lift to have bevel gears guarded.

Enclosing main gear drive of motor drive mills, and guarding of back and feed gears, also clutch feed at floor.

Chains:

Question of numbering all hook-on and hoisting chains for identification, by stamping numerals on hooks or attaching tags.

Weekly inspections and annealing of chains at proper intervals, record thereof to be made and filed. Annual inspections to be made of load chains on differential hoists.

Wherever possible wire ropes and wire rope slings to be substituted for chains.

Chipping Screens:

Screens of white canvas are generally advisable where chipping is done, and Committees should make recommendations where necessary.

Cranes—Jib:

Spur gears and pinions to be entirely enclosed on both power-driven and hand-operated cranes.

Cranes—Traveling:

A fender of three-eighths (⅜) inch plate applied to frame of crane truck, should be made flush with frame and extend to within three-eighths (⅜) inch of rail.

A railed walk extending full length of bridge.

Pockets or housing underneath all overhanging gears.

Limit switches for both main and auxiliary hoists.

Permanent ladders for cranemen located at end of runway, instead of on intermediate columns.

Platforms for crane operators to avoid climbing over track in reaching cages.

Recommendation for providing rail clamps when two or more cranes operate on same track,–to protect repairmen should either of the cranes be stopped for repairs.

Posting of rules forbidding employes going above to crane tracks without orders from Foreman in charge.

Daily examination and thorough weekly inspection of cables and chains, with written report thereof for filing and reference.

Drill Presses:

Guards for exposed bevel and spur gears, including clutch gears, back gears and bevel and spur gears at top of spindle.

On sensitive drills the belts at operator's head to be shielded, and belt drives at floor, railed.

Electrical Apparatus:

Wood slats or rubber mats for use at switchboards, transformers and other places as may be necessary, also at commutator end on generator sets.

Provision for protection of arc lamp trimmers by having locks or signs for switches.

Overhead platforms and runways for use of trimmers and electricians.

Motor starting boxes near floor to be screened or boxed.

Elevators:

Posting of instructions prohibiting any but regularly assigned operators from moving elevators. When the elevators are not in use or are undergoing repairs the operating cable or rod should be locked or clamped to insure safety; also when men are working in the pit the precaution should be taken to assign one man to operate the elevator, which should not be placed in regular service until the work has been completed.

On all new elevators iron gratings should be installed underneath overhead sheaves and ample head room allowed.

The application of bevel toe pieces may be recommended for all floor and shaftway openings and shaftway projections.

Elevator gates to extend to the floor and be not less than six (6) feet high. Gates to be semi-automatic on all but the bottom and top floors which should be full automatic.

All elevator hatches should be enclosed on all sides preferably with wire screen,—openings for doors to be not less than 6′ 6″ high.

Where counterweight runways are located outside of shaftway, consideration should be given to enclosing exposed sections.

Thorough weekly inspections and written reports thereof to be made and filed for reference.

Emery Wheels:

For protection against explosions or bursting, as well as for collection of dust, emery hoods should embody a band of one-fourth ($\frac{1}{4}$) inch or three-eighths ($\frac{3}{8}$) inch wrought iron about circumference. For dust a hopper should also be provided, and in addition, in polishing rooms, the question of

recommending a refuse exhaust system for dust, lint, and other refuse should be considered.

Emery wheels should be operated at moderate speed and the tool-rest adjusted to wear of the wheel. Safety collars should also be applied and care exercised to see that they are concave and not less than one-half the diameter of wheel. Wheels should be equipped with glass eye-guards in order to protect eyes of workmen in grinding tools.

No wheels should be accepted from the manufacturer unless the maximum safe speed is indicated thereon.

Engine Stops:

In addition to governor stops, to provide automatic stops which will operate independently,–for all high speed steam engines.

Gear Guards:

As a rule cast-iron covers with flanged edges are preferable. The flanges should be of sufficient depth to enclose base of gear teeth. The guards should be designed to completely cover the gears and pinions with which they mesh.

In some cases, as change feed gears on lathes, or where a special type of gear not in common use is to be guarded, sheet iron may be better adapted for the purpose, but in all cases the guards should be complete and of metal sufficiently heavy for the purpose. Where it is advisable to use sheet metal, No. 8 gauge (.165 inches) as a rule, should be specified and no metal lighter than No. 14 gauge (.083 inches) should be recommended.

Ice Hazards:

Entrances to buildings exposed by icicles,—and ice on walks, steps and inclines removed or kept sanded.

Jacks:

Inspection of lifting jacks at regular intervals. As far as practicable the use of jacks to be restricted to the actual

lifting of loads, and proper blocking or trestle put in place to support the load. Pawls of ratchet jacks to be examined weekly. Wherever possible use of jacks having vent hole in top to be avoided.

Jointers:

Safety circular knife heads for wood jointers or buzz planers, and automatically adjusted knife guards.

Ladders:

The use of portable ladders is attended with more or less danger, and wherever practicable recommendations for permanent ladders and stairways may be made. Where portable ladders are necessary they should be provided with iron spurs; on concrete floors the spurs should be of bass wood or other approved material.

Lathes:

Complete guarding of back and change gears.

Loose Floor Plates:

The use of sheet-iron floor plates as may be found in forge shops, should be noted, and wherever practicable recommendation made for their removal. These plates are liable to warp and curl; if metal plates are necessary only cast iron should be used. In some instances paving blocks on concrete may be preferable.

Material Platforms:

Committees should note where gangways in material yards require paving or flooring, and where obstructed by material.

Milling Machines:

Covering of all unguarded gears.

Mortisers and Boring Machines:

Flush set screws or set screws protected by collars, to be used in chucks and in collars on spindles, and shields applied in front of belts, and cotter pins in rods back of counterweights.

Moulding Machines:

Belts at side of operator boxed and knives hooded.

Planers:

Sheet metal aprons for open spaces in machine shop planer beds, and pulley drives rail guarded and screened.

Saws:

Enclosing upper and lower wheels of band saws in a boxing of wire netting and providing hoods and spreaders for rip saws.

Cut-off saws to have belt at front shielded and saw properly guarded.

Shafting:

When machinery is crowded and dangerous conditions exist due to overhead countershaft and belting, conditions may be improved by introduction of individual motor drive.

Substantial overhead runways, properly hand-railed on one or both sides, may be advisable at some points for line shafting to insure the safety of the Oiler and others, whose duties may require them to go above for adjustments or repairs. Oilers should also be provided with long-spout oil cans.

All extending set screws on shafting, and revolving machine parts, should be replaced by countersunk flush screws, or set screws protected by collars.

Shapers:

Guarding of main crank arm and spur gears.

Shears and Punches:

Enclosing main gears and pinions with sheet-iron boxing. Cotter pins to be placed in rods back of counterweights.

Slotters:

Guarding of main gear and pinion, also feed gears.

Slotters on which the crank extends outside the head to have shield provided on the down side.

Surfacers and Matchers:

Rail guarding of belts and pulleys on both sides, and belts at feed end guarded with shield. Knives and chain feeds to be hooded.

Tools:

Wherever practicable hand tools, such as drift pins, chisels and other similar tools should be turned into tool rooms for inspection weekly, or oftener if necessary. Care should be taken to keep the heads of tools free from burr, chips flying from such tools frequently causing serious injuries. Arrangement should be made that when tools are sent to smith shop the heads as well as cutting edge be given attention. For tools not regularly turned into tool room, semi-monthly inspection to be made wherever possible.

Trucks:

Motor trucks preferably should be constructed to operate from either end, and operator instructed to drive from forward end.

Wherever practicable, hand trucks to have overhanging frames on outside of wheels.

Vertical Spindle Shapers:

Knife guards to be provided and belts under table shielded.

Warning Signs and Safety Gates:

Warning signs for dangerous crossings and at other points of danger.

Also inside and outside of doorways opening directly onto tracks, in addition, it may be advisable in some instances to provide a swinging safety gate painted in red with word "Danger" lettered conspicuously on cross-bar, or a guard rail enclosure immediately outside of door. Where dangerous conditions exist at night the necessity for illuminated signs should be considered.

Yard Tracks:

In all tracks where frogs, guard rails and switches are not equipped with standard spring foot guards or other foot protection, attention should be drawn to same so that instructions can be given to Track Foremen.

Committees should note whether blue flag and light protection is used in accordance with Book of Rules.

Consideration should be given to use of metal flags,–flag standard to be provided with base similar to rail tongs and equipped with private lock.

SPECIAL SAFETY PRECAUTIONS—SHOPS

Most shop accidents may be avoided by observance of some simple precaution, among which special attention is directed to the following involving causes of accidents which are more or less common to all shops:—

Blue Flag Protection: In all car repair work on outside tracks there should be strict observance of this requirement as covered by Rule No. 26, Book of Rules. Foremen and Gang Leaders should be especially watchful to see that this rule is properly observed.

Car Repairs: In all repair work where trucks are removed from cars, trestles should be used thereunder until trucks are replaced.

Cleaning Clothes with Air Hose: The practice of shop employes using compressed air from shop and yard air lines for cleaning clothes has resulted in serious accidents and should be prohibited.

Cleaning and Oiling Machinery while in Motion: These practices are especially dangerous and all employes are cautioned against them.

Emery Wheels: All employes are cautioned against grinding on side of emery wheels, as serious injuries have resulted from this practice.

Flying Rivet Heads: This is a prolific cause of accidents and all men engaged in the work are cautioned to exercise extreme care, both for their own protection and for the protection of their fellow workmen. The use of canvas guards is urgently recommended in all car repair work in order to reduce the number of these accidents.

Goggles: The wearing of goggles is recommended for men engaged in occupations where eye injuries are more or less frequent, due to spawls and emery dust, particularly steel car repairmen, boiler makers and men employed in chipping driving boxes using air hammers. For this work goggles should be worn at all times.

Hammers or Sledges Glancing: Employes when holding cutter bars, handle punches or drifts should stand on off side of workman swinging sledge.

Lifting Material,—Cranes and Air Hoists: In connecting up chains to articles to be lifted care should be exercised to avoid short hitches which result in stresses greatly exceeding the weight to be lifted.

Lifting and Handling Material: Many accidents are due to handling of material and to material falling and to men being caught between material, causing wrenches and strains. In lifting operations it is important in each movement that the men act in unison, both in taking hold and letting go in dropping or placing the "load". In trucking, as far as practicable care should be exercised to see that the material is properly secured to prevent slewing and falling off.

Nails Protruding from Boards: Nails are most frequently found in roofing and siding removed from box cars around car repair tracks, and all workmen are particularly cautioned in removing boards and planks to see that they are piled with nails turned downwards.

Obstruction of Passageways: Foremen and Gang Leaders should see that passageways are kept clear of material, and that material is properly stacked to prevent falling.

Shoes: Men handling molten metal should be requested to wear Congress shoes while at work.

Short Sleeve Jackets: Long loose sleeves have been responsible for many accidents due to sleeves becoming caught in projecting set screws and other revolving machinery. To insure safety, sleeves should be short and tight fitting and it is important that all machine operators observe this precaution.

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THE PENNSYLVANIA RAILROAD COMPANY

INSURANCE DEPARTMENT

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