

FROM COLLECTION OF
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*Approved
corrected to
July 30 1928*

STANDARD PRACTICE
AS TO
LIMIT OF WEAR ON LOCOMOTIVE PARTS

Office of Vice-President, Operating Department,
Chicago, Illinois, October 1, 1926.

Standard Practices as to Limit of
Wear on Locomotive Parts.

HHU Cir. 1-67, 3-28-28.

Page 5 - Air Pumps.

Item "C" now reads "Limit of wear on piston rods shall be $3/32$ inches". Change this to read "Limit of wear on piston rods shall be $1/16$ inches".

Page 10 - Driving Boxes.

Item "C" now reads "Limit of wear on driving box crown brasses shall be $1/2$ inches". This should be changed to read "When the crown brass fit in driving boxes has been worn or slotted until our standard driving box shell will not have stock enough for machining, the box should be restored to the standard diameter".

HHU Cir. 1-233, 6-26-28.

Page #5, Air Pumps.

Item "A" - Original Diameter of $9\frac{1}{2}$ " worn to $9-13/16$ ". Change this to read "worn to $9-7/8$ inches, last boring should be $9-13/16$ inches".

HHU Letter 7-6-28.

Page #2 Section Driving Wheel Centers.

"Main crank pin holes shall not be larger than $1/2$ " over dimension specified on drawing".

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BOILER

Limit of wear on boiler steel shall be determined by rigid inspection of the condition and where the condition of the boiler shell is such that it requires new sheets, or patches, the matter shall be referred to the Mechanical Engineer.

FIREBOX

Limit of wear on fire door cylinders shall be $3/16$ ".

Fire door cylinder pistons shall be renewed when $1/16$ " smaller than diameter of fire door cylinder.

WASHOUT PLUGS

Size of Standard washout plugs shall not be more than $1/2$ " greater than original diameter.

Size of arch tube plugs shall not be more than $1/2$ " greater than original diameter.

STAYBOLTS

Size of Rigid staybolts shall not exceed 1-1/4" in diameter.

Size of Flexible staybolts shall not exceed 1-3/16" in diameter.

Size of Flexible radial stays at the firebox shall not exceed 1-5/16".

Size of rigid crown stays shall not exceed 1-1/2" in diameter in firebox end and 1-3/8" in the outer sheet.

Bushings used for reducing size of staybolts in outer sheet shall not exceed 1-3/4".

FLUES

-) Flues of 2-1/4" diameter and smaller that have been reduced in weight to less than 60% of the original weight shall be renewed.
-) Flues which have become pitted shall be reclaimed by welding at a cost of not to exceed 50% of cost of new flue.
-) In safe ending flues not more than three (3) safe ends shall be used.

DRIVING WHEEL CENTERS

Outside diameter of driving wheel centers worn 1/8" less than shown on drawings shall be restored to original size by autogenous welding.

Main crank pin holes shall not be larger than than 1/2" over dimension specified on drawing

DRIVING AXLE JOURNALS

-) For 7" and 8" driving axle journals the last turning shall be $5/16$ " and shall be renewed when diameter is $3/8$ " below original diameter.
-) On all larger driving axle journals the last turning shall be $7/16$ " and shall be renewed when worn $1/2$ " below original diameter.

CRANK PINS

- a) Last turning of main crank pins shall be $1/4$ " and shall be renewed when worn $5/16$ " below original diameter.
- b) Last turning of side rod pins shall be $5/16$ " and shall be renewed when worn $3/8$ " below original diameter.

CARRYING GEAR

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- b) Limit of wear on carrying gear and driver brake pins shall be $1/8$ ".
- b) Limit of wear of spring and saddle bearing pockets shall be $3/16$ ".
- c) Limit of wear on equalizer bearings shall be $3/8$ ".

ENGINE TRUCK

- (a) Last shop turning of engine truck axle journals shall be $5/16$ " below original diameter, and shall be renewed when worn $3/8$ " below original diameter.
- (b) Swing bolster center pin pocket worn $1/4$ " shall be restored to original size.
- (c) Male center pin worn $1/4$ " in diameter shall be restored to original size.
- (d) The combined wear of engine truck swing bolster center pin pocket and male center pin shall not exceed $1/2$ ".
- (e) Engine truck pedestal shoes worn $1/8$ " shall be renewed.
- (f) Engine truck journal boxes worn $1/4$ " between shoe bearings shall be renewed.
- (g) Pin holes in engine truck frame worn $3/16$ " shall be restored to original size.
- (h) Equalizer at journal box seat worn $1/4$ " shall be restored to original size.
- (i) Swing link top and bottom holes worn $3/16$ " shall be restored to original size.
- (j) All engine truck pins worn $1/8$ " shall be renewed.
- (k) Engine truck equalizer and spring hanger pin holes worn $1/8$ " shall be restored to original size.

TRAILER TRUCK

-) Last turning of trailer truck axle journals shall be $5/16$ " and shall be renewed when worn $3/8$ " below original diameter.
-) Trailer truck journal boxes worn $3/8$ " between shoe bearings shall be renewed.

AIR PUMPS

-) When cylinders have reached the following limits they shall be restored to original diameter:

<u>Original Diameter</u>	<u>Worn To</u>
8-1/2 Inches	8-3/4 Inches
9 "	9-1/4 "
9-1/2 "	9-13/16 "
11 "	11-5/16 "
14-1/2 "	14-13/16 "

9 7/8" last bearing should be 9-13/16"

- b) Limit of wear of steam and air piston heads shall be $3/32$ " and last turning shall be $1/16$ " smaller than original diameter.
- c) Limit of wear on piston rods shall be ~~$3/32$ "~~ $1/16$ "
- d) Air pump main valve pistons worn $1/32$ " shall be renewed.
- e) Air pump main valve piston bushings worn $3/16$ " shall be renewed.

THROTTLE

- (a) Limit of wear of throttle rod brass sleeve shall be $3/64$ "
- (b) Combined wear of throttle rod quadrants and latch teeth shall be $1/16$ ".

FEED WATER PIPING

- (a) All threaded brass fittings in connection with feed water piping shall be maintained standard.
- (b) The stems on all valves used in connection with feed water piping shall be renewed when worn $1/32$ ".
- (c) Limit of wear on Worthington Boiler Feed Pump parts shall be in accordance with instructions issued by the Worthington Pump and Machinery Corp. dated Oct. 1st, 1925.

HEADLIGHT

- (a) Limit of wear of main shaft bearing shall be $1/64$ ".
- (b) Limit of wear of ball bearings shall be $1/32$ ".
- (c) Limit of wear of turbine wheel buckets shall be $3/64$ ".
- (d) Limit of wear of steam end bronze bearing shall be $1/64$ ".
- (e) Limit of wear of headlight commutator shall be as follows:

Pyle K-2	- -	$7/16$ inch
Pyle E	- -	$9/16$ inch
Loco	- -	$1/4$ inch

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BOILER TRIMMINGS

All threaded brass fittings in connection with boiler trimmings shall be maintained standard.

FRAMES

All frame bolts shall not exceed $1/4$ " of original diameter.

CYLINDERS

- a) Limit of wear of cylinders shall be $1/2$ " of the original diameter.
- b) Piston valve bull rings worn $3/32$ " smaller than valve bushings shall be renewed.
- c) Limit of wear of valve bushing shall be $3/8$ ".

PISTONS

- a) Piston heads $1/4$ " smaller in diameter than cylinder shall be restored to original size.
- b) Limit of wear on piston rods shall be $1/4$ ".
- c) Last turning of piston rods shall be $3/16$ " below original diameter on road engines and $7/32$ " on switch engines.

*See letter for
Anderson's integrated
piston rods.*

GUIDES

- a) Guides on class "A" locomotives worn $1/4$ " in width and $3/16$ " in thickness shall be renewed.
- b) Guides up to and including $5-1/2$ " wide, worn $1/2$ " in width and $3/8$ " in thickness shall be renewed.
- c) Guides over $5-1/2$ " wide, worn $3/4$ " in width and $5/8$ " in thickness shall be renewed.
- d) Guide bolts shall not exceed $1/4$ " of original diameter.

CROSSHEAD

- a) Large crosshead wrist pin hole shall not exceed $3/8$ " of original size and the small hole shall not exceed diameter of wrist pin journal.
- b) Limit of wear on wrist pins shall be $1/2$ ".
- c) Crosshead bolts shall not exceed $1/8$ " over original size.
- d) Crosshead piston fit shall not exceed $3/16$ " of original size.

RODS

- (a) Limit of wear on brass fit of main rods with fork ends shall not exceed $1/4$ " of original opening, and width of strap shall not be reduced more than $1/8$ ".
- (b) Side rod holes shall not exceed $1/4$ " of original diameter.
- (c) Limit of wear on all knuckle pins shall be $1/2$ ".
- (d) Knuckle pin holes shall not exceed $3/4$ " of original diameter.
- (e) Main rod bolts shall not exceed $1/4$ " of original diameter.

VALVE MOTION

- a) Limit of wear on valve stems shall be $1/4$ ".
- b) Last turning on valve stems shall be $3/16$ " of the original diameter on road engines and $7/32$ " on switch engines.
- c) Limit of wear on valve motion pins shall be $3/64$ ".
- d) Outside diameter of valve motion pin bushing shall not exceed $1/8$ " over original size.
- e) Last turning on rocker arm journals shall be $3/8$ " of original size.
- f) Last turning of lifting shaft journals shall be $1/4$ " of original size.
- g) Limit of wear on Stephenson links shall be $1/4$ " in width and $3/16$ " in thickness.
- h) Limit of wear on Walschaert links shall be $1/8$ " on each wearing surface.
- i) The combined wear on power and hand reverse lever quadrant and latch teeth shall not exceed $1/16$ ".

ECCENTRICS

- a) Limit of wear on eccentrics shall be $1/4$ " of original diameter.
- b) Eccentric strap shall be renewed when worn $3/8$ " through the section at point of wear or when lateral exceeds $1/4$ ".

DRIVING BOXES

(a) Limit of wear on driving box hub face shall be $3/8$ ".

(b) Thickness of liners used in shoes or wedges shall not exceed $1/2$ ".

(c) Limit of wear on driving box crown brasses shall be $1/2$ ".

Change to read "When the crown brasses fit in driving boxes has been worn or slotted until our standard driving box shell will not have stock enough for machining, the box should be restored to the standard diameter"

STOKERS

Limit of wear on Duplex stoker parts shall be in accordance with instructions issued by the Locomotive Stoker Company in their booklet on "Suggestions for Maintenance of Duplex Stokers."