REVISIONS IN SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES IN NATIONAL FORESTS AND NATIONAL PARKS, 1941, AS OF JULY 15, 1941

(Insert in first edition of specifications published by the Public Roads Administration, Federal Works Agency, 1941.)

In considerable part, these revisions are required in order to conform with recent revisions in Specifications for Highway Bridges of the American Association of State Highway Officials.

ON PAGE 20, ARTICLE 6.2. Add the following words at the end of the seventh paragraph under article 6.2: "provided however that the specific citation 'Standard Specifications for Highway Bridges (1941) of the A. A. S. H. O.' shall refer exclusively to the said 1941 edition."

ON PAGE 39, ARTICLE 8.6. Third paragraph, delete the first sentence and substitute the following: "Contract time shall begin on the calendar day immediately following the date of receipt by the contractor of the notice to proceed."

ON PAGES 114, 119, 124, 168, AND 173; SUBSECTIONS 51–3.1, 52–3.1, 52A–3.1, 101–3.1, AND 102–3.1. After the words "spreader boxes" insert the words "or approved mechanical equipment," and at the end of the same sentence, insert the following sentence: "Material may be initially placed by an approved windrow method whenever the equipment so requires."

ON PAGE 140, SUBSECTION 57–2.1. Change the percentage limits passing the ¾-inch sieve from "55–45" to "55–75."

ON PAGE 143, SUBSECTION 58–3.1. In the second line delete the word "two," and after paragraph (*b*) insert the following paragraph:

"(*c*) Where the existing surface has been previously bituminized and scarifying is ordered, the surface shall be scarified, any lumps broken down to aggregate size by disking or other satisfactory methods and the bituminized aggregate windrowed or otherwise conserved as directed by the engineer, for remixing with bitumen and re-laying under this or other items in the contract. The underlying subgrade shall be shaped to uniform grade and to the appropriate cross section shown on the plans, and the whole rolled with a self-powered roller."

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ON PAGES 206, 207, 221, AND 222, SUBSECTIONS 120–3.3, 3.4, 3.5, AND 122–3.3, 3.4, 3.5. After the word "plans" in the first sentence, insert the words "as elsewhere specified."

ON PAGES 211 AND 212, SUBSECTION 121–2.1. In the first paragraph replace the words "gradings A, B, C, and D" with "all gradings except E, E1, and E2"; replace the words "grading E" with "gradings E, E1, and E2"; and replace the words "table 1" with "tables 1, 2, and 3." In the first paragraph following table 3, replace the words "table 1" with "tables 1, 2, and 3." In the second paragraph following table 3 replace the words "A, B, C, or D" with "except gradings E, E1, or E2."

ON PAGE 262, SUBSECTION 133–2.1. In table 2 under "chips," the percentage passing a No. 8 sieve change to read "0–10."

ON PAGE 267, SUBSECTION 140–1.3. In the first sentence, replace the words "table 1" with "tables 1, 2, and 3."

ON PAGE 282. Delete the first line under **METHOD OF MEASUREMENT** and substitute the following: "141–4.1 The tonnage to be paid for shall be the number"

ON PAGE 332, SUBSECTION 220–2.1. Revise the reference in first paragraph to read, "Standard Specifications for Highway Bridges (1941) of the A. A. S. H. O., division IV, sections 6 to 11, inclusive."

Delete the last paragraph of subsection 220–2.1.

ON PAGE 334, SUBSECTION 220–3.1. Delete the last two lines and substitute: "(1941) division II, section 10, except subsections 42, 43, 45, 55, 56, 57, 58, 59, and 61."

ON PAGES 334 AND 335. Delete subsection 220–3.2 and the first four paragraphs of subsection 220–3.3, together with the side heading "(*b*) *Painting Galvanized Surfaces*" and substitute the following:

"220–3.2 RAILING.—All railing shall meet the requirements detailed on the plans.

"220–3.3 PREPARING METAL SURFACES FOR PAINTING.—(*a*) Surfaces not galvanized shall be cleaned as prescribed under (*c*) using Method A unless otherwise indicated on the plans.

"(*b*) *Treating Galvanized Surfaces.*"

ON PAGE 336. Delete the first sentence of the last full paragraph and substitute the following text, subsections 220–3.4, 220–3.5, and 220–3.6 to end quote:

"220–3.4 **PAINTING METAL SURFACES.**—(*a*) The painting shall include preparation and cleaning the surfaces, furnishing the paint and other materials, applying the paint and the supplying of all tools, equipment, tackle, scaffolding, and labor.

"(*b*) The paint shall be thoroughly mixed or stirred immediately before applying in order to keep the pigments in uniform suspension. If it is necessary in cool weather to thin the paint in order that it shall spread more freely this shall be done by heating in hot water or on steam radiators, and liquid shall not be added or removed unless permitted by the engineer.

"(*c*) Paint may be applied with hand brushes or by spraying. The coating of paint applied shall be smoothly and uniformly spread so that no excess paint will collect at any point. If work done by spraying is not satisfactory to the engineer hand work will be required.

"The coating shall be even and in close contact with the metal or with previously applied paint. On all surfaces which are inaccessible for paint brushes the paint shall be applied by spraying or by sheepskin daubers. If the painting is unsatisfactory to the engineer the paint shall be removed and the metal thoroughly cleaned and repainted.

"(*d*) *Brushing.*—Brushes used shall be round, oval, or flat in shape, the latter not over 3 inches in width. The paint shall be worked into all corners and crevices.

"(*e*) *Spraying.*—(Insert the language under this title previously deleted from page 335).

"(*f*) *Weather Conditions.*—Paint shall not be applied when the air temperature is below 40° F. or when the air is misty, or when, in the opinion of the engineer, conditions are otherwise unsatisfactory for the work. It shall not be applied upon damp or frosted surfaces.

"Material painted under cover in damp or cold weather shall remain under cover until dry or until weather conditions permit its exposure in the open. Painting shall not be done when the metal is hot enough to cause the paint to blister and produce a porous paint film.

"220–3.5 **SHOP PAINTING.**—In addition to all requirements specified above shop painting shall include and meet all the requirements of subsection 2.14.11 of the above A. A. S. H. O. specifications.

"220–3.6 **FIELD PAINTING.**—Field painting shall meet the requirements of subsection 2.14.12 of the above A. A. S. H. O. specifications, with the following additional requirements."

ON PAGE 337, SUBSECTION 220-4.1. Delete that part of subsection beginning with third paragraph and substitute the following:

"The unit weight of metals in pounds per cubic foot shall be 173—aluminum; 536—cast bronze; 536—copper-alloy; 558—copper sheet; 445—cast iron; 470—malleable iron; 487—wrought iron; 707—sheet lead; 490—steel (cast, copper bearing, carbon, silicon, nickel, and stainless); and 450—zinc.

"The weights of rolled shapes, and of plates up to and including 36 inches in width, shall be computed on the basis of their nominal weights and dimensions, as shown on the approved shop drawings, deducting for copes, cuts, and all open holes, except rivet holes.

"To the nominal weights of plates more than 36 inches in width, there shall be added one-half the allowed percentage of overrun in weight given in the specifications, A. S. T. M. A7.

"The weight of all rivet heads, both field and shop, shall be included as structural steel on the basis of the following weights:

Diameter of rivet in inches	½	⅝	¾	⅞	1	1⅛	1¼
Pounds per 100 heads	4	7	12	18	26	36	48

"The weight of castings shall be computed from the dimensions shown on the approved shop drawings, deducting for open holes. To this weight shall be added 10 percent allowance for fillets and overrun.

"The weight of railing shall be included as structural steel unless specified that railing be measured for payment on a linear foot basis.

"The weight of steel grid flooring shall be computed separately except when required to be included as structural steel.

"The weight of brass shims shall be included as structural steel and shall be computed on the basis of the unit weight of copper-alloy.

"Full size eyebars, which are tested and meet specification requirements, shall be included in the measurement for payment.

"To the total computed weight of metal shall be added 0.4 of 1 percent as an allowance for shop paint."

ON PAGE 340, SUBSECTION 230-2.1. Delete in first paragraph the reference to "Section 20 of division II of the A. A. S. H. O. 'Standard Specifications for Highway Bridges' (1935)" and substitute "Section 25 of division IV of the A. A. S. H. O. 'Standard Specifications for Highway Bridges' (1941)."

In the first line under paragraph (*a*), revise the reference to "Article 2.20.3" to read "Subsection 4.25.3."

In the first line under paragraph (*b*), revise the reference to "Article 2.20.5" to read "Subsection 4.25.5."

ON PAGE 340, SUBSECTION 230-2.2. Revise reference to "Section 20 of division II" to read "Section 25 of division IV, except subsection 4.25.5."

ON PAGE 340, SUBSECTION 230-2.3 (*a*). Delete the sentence under this paragraph and substitute the following: "The creosote shall be a distillate of coal-gas tar or coke-oven tar. The creosote-coal-tar solution shall be a coal-tar product of which at least 80 percent shall be a distillate of coal-gas or coke-oven tar, and the remainder shall be refined or filtered coal-gas tar or coke-oven tar. Creosote and creosote-coal-tar solution shall conform to the following requirements:

	Creosote	Creosote-coal-tar solution
1. Water, maximum percent	3.0	3.0
2. Matter insoluble in benzol (except that 1 percent tolerance allowed for samples taken from working tanks), maximum percent	0.5	2.0
3. Specific gravity at 38°/15.5° C	1.03+	1.05–1.12
4. Distillate based on water-free oil:		
To 210° C–maximum, percent	5.0	5.0
To 235° C–maximum, percent	25.0	25.0
5. Coke residue of oil–maximum, percent	2.0	6.0

ON PAGE 343, SUBSECTION 230-3.2. Delete the last 5 lines of the first paragraph and all of the second paragraph and substitute: "following:

"*Air seasoning.*—Materials to be treated, preferably, shall be air seasoned until the moisture remaining in the wood will not prevent the injection and proper distribution of the specified amount of preservative. For air seasoning the materials shall be stored as follows: Lumber shall be segregated according to size and each layer in the pile shall be separated by at least 1-inch strips with an air space of 1 inch or more between each two pieces of lumber in any layer; for caps, stringers, posts or larger timbers, at least 2-inch strips shall be used to separate the layers. Alleys at least 3 feet wide shall be left between rows of stacks and the material shall be at least 12 inches off the ground on concrete or treated timber sills. The space under and between the rows of stacks shall be kept free at all times of rotting wood, weeds or rubbish. The yard shall be so drained that no water can stand under the stacks or in their immediate vicinity.

"*Steam seasoning for southern yellow pine.*—Southern yellow pine may be steam seasoned until the moisture remaining in

the wood will not prevent the injection and proper distribution of the specified amount of preservative. The material shall be steamed in the cylinder at not more than 20 to 25 pounds pressure per square inch for not more than 8 hours for sawed timber, the maximum pressure being reached in not less than 2 hours. The cylinder shall be provided with vents to allow the escape of air and insure proper circulation of the steam. After steaming is completed a minimum vacuum of 22 inches shall be maintained for not less than 15 minutes, or until the wood is as dry and free from moisture as practicable. The cylinder shall be relieved continuously or frequently enough to prevent condensate from accumulating in sufficient quantity to reach the wood. Before the preservative is introduced, the cylinder shall be drained of condensate.

"*Oil seasoning for Douglas fir.*—Douglas fir may be seasoned by boiling in oil under a vacuum until the moisture remaining in the wood will not prevent the injection and proper distribution of the specified amount of preservative.

"The material shall be boiled in creosote under a vacuum at temperatures which do not exceed 220° F. for piling and 200° F. for sawed timber and lumber. A minimum vacuum of 20 inches shall be maintained during boiling. The seasoning period shall be maintained until condensation passing off from the timber is at the rate of approximately one-sixth pound per cubic foot per hour.

"*Preparation for treatment.*—Timber and lumber to be treated shall be prepared for treatment in accordance with the requirements set forth in subsection 2.21.3 of the A. A. S. H. O. 'Standard Specifications for Highway Bridges' (1941)."

ON PAGE 343, SUBSECTION 230-3.3. Delete the sentence under this subsection and substitute the following: "Treating plants shall be equipped with the thermometers and gages necessary to indicate and record accurately the conditions at all stages of treatment, and all equipment shall be maintained in a condition satisfactory to the engineer. The apparatus and chemicals necessary for making the analyses and tests required by the engineer shall also be provided by the plant operators, and kept in condition for use at all times."

ON PAGE 343, SUBSECTION 230-3.4. Delete the paragraph under this subsection and substitute the following: "The range of pressure, temperature, and time duration shall be controlled so as to insure satisfactory treatment and result in a maximum penetration by the quantity of preservative injected. The vacuum requirements stipulated are in inches of mercury at sea level, and necessary corrections shall be made for altitude.

"In southern yellow pine, the preservative shall permeate all of the sapwood and as much of the heartwood as practicable, provided however, that any penetration exceeding 2 inches in depth shall be considered as full sapwood penetration. In case of sawn timbers, the location of the test boring shall be selected at the point of maximum sapwood thickness.

"In Douglas fir the minimum penetration in inches for the specified amounts of creosote oil or solutions thereof per cubic foot of wood shall be as follows:

For sawn piling, and timbers 12 inches by 12 inches and larger.

Pounds of preservative	8	10	12	14	16
Inches penetration	0.55	0.65	0.75	0.85	1.00

For timbers less than 12 inches by 12 inches, the required depth of penetration shall be determined by the formula, $PR_s = P_sR$. Where P is required penetration; P_s is specified penetration for 12-inch by 12-inch timbers; R is ratio of the volume of the piece in question to its superficial area; and R_s is ratio of the volume of a 12-inch by 12-inch timber to its superficial area.

"The penetration of the preservative shall be based on black or dark oil, and in no case will light discoloration of the wood, due to treatment, be taken into consideration in measuring the depth of penetration. In gaging the depth penetrated by preservatives other than creosote oil the method used shall be such as will enable the engineer to determine, to his satisfaction, the actual depth penetrated.

"Tests for penetration shall be made by taking borings with an increment borer, or a ⅝-inch auger, all holes so bored to be plugged by the contractor with tight-fitting creosoted plugs.

"As many penetration tests of timber and lumber shall be made as is considered necessary by the engineer."

ON PAGES 343 AND 344, SUBSECTION 230-3.5. Delete paragraphs (*a*) and (*b*) and substitute the following:

(*a*) *Oil Treatments.*—When creosote preservatives are used, timber and lumber shall be treated by either the full-cell process, empty-cell process with initial air, or empty-cell process without initial air. The wood shall be properly seasoned and conditioned, and for treatment shall be placed in a tightly sealed treating retort or cylinder. In the case of the full-cell process, the wood shall be subjected to an initial vacuum of not less than 20 inches or of sufficient intensity and duration to insure that the wood is as free from moisture and air as practicable, and the retort or cylinder then filled with preservative without breaking the vacuum. For the empty-cell process with initial air, the wood in the sealed treating retort or cylinder shall be

subjected to an initial air pressure of sufficient intensity and duration to provide under a vacuum the ejection of surplus preservative, and to insure a retention and proper distribution of the stipulated number of pounds of preservatives per cubic foot of wood, after which the cylinder shall be filled with preservative under the maintained pressure. In the case of empty-cell process without initial air, the preservative shall be introduced into the treating retort or cylinder at atmospheric pressure. Following filling of treating chamber, the pressure shall be raised and maintained at not less than 100 pounds per square inch nor more than 200 pounds per square inch until the quantity of preservative required to insure final retention stipulated is injected into the wood or, failing this, until the engineer is satisfied that the largest volumetric injection that is practicable has been obtained. The preservative shall be introduced into the treating chamber at a temperature between 150° F., and 200° F., and shall be maintained during the pressure period between these limits and at an average of 180° F. After pressure is completed, the retort or cylinder shall be emptied speedily of preservative and a vacuum of not less than 20 inches promptly created and maintained until the wood can be removed from the cylinder free from dripping preservative. Alternate methods for freeing wood of dripping preservative with equivalent results and which are satisfactory to the engineer will be permitted.

"Prior to treatment of Douglas fir and when deemed desirable by the engineer, the wood shall be heated in preservative gradually to not more than 200° F., and held at that temperature for not more than 6 hours. In the case of green Douglas fir lumber, the wood shall be seasoned by boiling under vacuum as hereinbefore provided.

"(*b*) *Zinc Chloride Treatments.*—Methods for zinc chloride and chromated zinc chloride treatments shall comply with those hereinafter prescribed under (*c*) for Wolman salts treatment except that the initial vacuum in the treating chamber shall be not less than 22 inches."

ON PAGE 346. In paragraph (*e*) under subsection 230–3.5 delete the words "(*e*) Full-cell process."

ON PAGE 380, SUBSECTION 248–2.1. In line 2, delete the figures "(1935)" and substitute "(1941)." In line 3, delete the figures "2.16.2" and substitute "4.21.2."

ON PAGE 380, SUBSECTION 248–3.1. In line 3, delete the figures "3.9.3" and substitute "2.9.3."

ON PAGE 472, SUBSECTION 400–2.1. In the first paragraph delete the figures "5" and "20" and replace with the figures "2" and "10" respectively; and at the end of the paragraph add the following sentence: "Within the above limits, the contractor shall furnish topsoil at least equal in organic content to the average productive field or woodland topsoils in the locality."

ON PAGE 475, SUBSECTION 401–3.3. At the end of the second sentence, add the following phrase: "and moistened as directed."

ON PAGE 475, SUBSECTION 401–3.5 Add the following sentence at the end of the paragraph: "The contractor shall water, mow, and otherwise properly maintain to the engineer's satisfaction, all sodded areas until the final acceptance."

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ON PAGE 172, SUBSECTION 400-2.1. In the first paragraph delete the figures "5" and "20" and replace with the figures "2" and "10" respectively; and at the end of the paragraph add the following sentence: "Within the above limits, the contractor shall furnish topsoil at least equal in organic content to the average productive field or woodland topsoils in the locality."

ON PAGE 175, SUBSECTION 401-3.3. At the end of the second sentence, add the following phrase: "and moistened as directed."

ON PAGE 175, SUBSECTION 401-3.5. Add the following sentence at the end of the paragraph: "The contractor shall water, mow, and otherwise properly maintain to the engineer's satisfaction, all sodded areas until the final acceptance."

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