

NFPA No.

46

OUTDOOR STORAGE OF FOREST PRODUCTS 1973



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Recommended Safe Practices for
Outdoor Storage of Forest Products

NFPA No. 46 — 1973

1973 Edition of No. 46

These recommended safe practices were prepared by the Sectional Committee on the Storage of Forest Products, approved by the Committee on General Storage, and were adopted on May 17, 1973 at the NFPA Annual Meeting in St. Louis, MO.

Origin and Development of No. 46

Part I, Outdoor Storage of Lumber and Timber at Other than Retail or Wholesale Yards, was adopted by the NFPA in 1960.

Part II, Outdoor Storage of Ties, Poles, Piles, Posts, and Other Similar Forest Products at Pressure Treating Plant Yards, was tentatively adopted by the NFPA in 1959. Following revisions, Part II was finally adopted by the NFPA at the 1961 Annual Meeting.

This edition is a complete revision of Part I and Part II and supersedes the 1961 edition.

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Recommended Safe Practices for Outdoor Storage of Forest Products

NFPA No. 46 — 1973

PART I

OUTDOOR STORAGE OF LUMBER AND TIMBER AT OTHER THAN RETAIL OR WHOLESALE YARDS

Chapter 1. Purpose

11. The intent of these recommendations is to provide fire protection guidance to minimize the fire hazard in yard storage areas containing lumber, timber, and other similar wood products. Each individual property will have its own special conditions of yard use, material handling methods and topography. For this reason, only basic fire protection principles are recommended herein that are intended to be applied with due consideration of all local factors involved.

Chapter 2. Definitions

21. **Yard** shall mean the outdoor areas where lumber and other wood products, as described in section 11, are stored outside buildings.

22. **Clear Space** shall mean any area free of combustible materials. This does not preclude the storage of noncombustible materials that will not transmit an exposure fire.

23. **Fire Lane** shall mean a clear space suitable for fire fighting operations by motorized fire apparatus.

24. **Alleyway** shall mean an accessible clear space between storage piles or groups of piles suitable for housekeeping operations, visual inspection of piling areas and initial fire fighting operations.

25. **Lumber** as used herein shall mean lumber, timber and other similar wood products.

Chapter 3. Lumber Storage Yards

31. General

3101. Fire loss experience in lumber storage yards indicates that large undivided piles, congested storage conditions, delayed fire detection, inadequate fire protection and ineffective fire fighting tactics, are the principal factors that allow lumberyard fires to reach serious proportions. The fire hazard potential inherent in lumber storage operations with large quantities of combustible material can best be controlled by a positive fire prevention program under the direct supervision of top management and should include:

(a) Selection, design and arrangement of storage yard area and handling equipment based upon sound fire prevention and protection principles.

(b) Facilities for early fire detection, transmission of alarm and fire extinguishment.

(c) Fire lanes to separate large piles and provide access for effective fire fighting operations.

(d) Separation of yard storage from mill operations and other exposing properties.

(e) Regular yard inspections by trained personnel, including an effective fire prevention maintenance program.

3102. Special problems of construction and protection are involved with cargo yards having lumber stored on piers or wharves and lumber stored on raised platforms. The standard for construction and protection of piers and wharves, NFPA No. 87, Piers and Wharves, and the authority having jurisdiction should be consulted in each case.

32. Basic Lumberyard Protection

3201. In all lumber storage operations, provision should be made for early fire detection and extinguishment. This requires watchman and alarm service, fire brigade manpower and extinguishing equipment, and ready access by means of fire lanes into all parts of the storage area so that fire extinguishing equipment can be promptly brought to the site of the fire.

3202. When a fire is discovered, no matter how small, the public fire department and plant fire brigade should be notified at once. The telephone number of the fire department and the location of the nearest fire alarm box should be posted conspicuously in several locations in the yard and buildings.

3203. In storage yards, a reliable means for prompt transmission of fire alarms to public fire departments and private fire brigades should be provided at convenient and accessible locations in the yard.

3204. It is recommended that standard, hourly watchman service be maintained throughout the night and during all non-operating periods. Watchman must be competent and rounds should be supervised by an approved central station, watchman's time detector or recorded by a portable watch clock.

3205. Watchmen and other employees should be fully instructed in the proper procedure of transmitting a fire alarm and in the use of all fire protection equipment (refer to Guard Service in Fire Loss Prevention, NFPA No. 601, and Guard Operations in Fire Loss Prevention, NFPA No. 601A).

3206. It is recommended that a fire brigade be organized. It should be well trained and adequately equipped to combat fire while the public fire department is responding to the alarm. Refer to NFPA No. 27, Private Fire Brigades, and to the NFPA Industrial Fire Brigades Training Manual.

3207. Portable fire extinguishers suitable for the fire hazard involved should be provided at convenient conspicuously accessible locations in the yard. Where practicable, approved portable fire extinguishing equipment should be placed so that maximum travel distance to the nearest unit should not exceed 75 feet. (See NFPA No. 10, Installation of Portable Fire Extinguishers, and NFPA No. 10A, Maintenance and Use of Portable Fire Extinguishers.) It is recommended that approved fire extinguishers of suitable type be provided on all power vehicles and units including haulage or private locomotives in the yard.

3208. A yard fire hydrant system connected to an ample water supply should be provided. For basic fire protection, the system should be capable of supplying at least four 2½-inch hose streams simultaneously (1,000 gpm minimum). Where large-scale fire fighting operations may be expected, larger water supplies with adequate mains are needed. See section 33.

Hydrants should be of an approved type with the same hose threads as used by the local fire department and preferably located at fire lane intersections. For early extinguishment with basic fire protection, hydrants should be so spaced with sufficient 2½-inch hose attached to permit rapid hose laying to all parts of the piling areas. For this reason, it is recommended that hydrants be spaced at about 250-foot intervals so that any part of the yard can be reached with 200 feet of hose. A hydrant hose house with at least

200 feet of fire hose and auxiliary equipment shall be provided at each hydrant. (See NFPA No. 24, Outside Protection.)

Hydrants and hose houses shall be kept free of obstructions at all times.

3209. All-weather roadways capable of supporting fire department apparatus should be provided to the plant and yard from public highways.

33. Special Lumberyard Protection

3301. Yards consisting of single carrier loads of green flat-piled lumber present a minimum hazard that generally requires only the basic protection provisions of section 32 for fire control. High piles of lumber stickered for air drying present a very severe hazard that will require effective use of large stream equipment and greatly expanded water supplies for fire control. In yards requiring more than the basic protection provision of section 32 for fire control, the following provisions are recommended as a guide. The relative importance of these provisions and the degree to which they may be needed will vary with yard conditions and the authority having jurisdiction should be consulted in all cases.

(a) Powerful water supplies and large mains should be provided where public or private fire department response, with manpower and equipment that can use these supplies, is available. Large stream equipment such as portable turrets and deluge sets requires 750 to 1000 gpm for each appliance. Monitor towers may require supplies in excess of 1000 gpm for each unit. In large yards where the hazard is severe, many of these devices may be operated simultaneously.

(b) Fire lanes suitable for fire department operations shall be provided with storage arranged so that no part of the occupied area is more than 50 feet distant in any direction from access by motorized fire fighting equipment. Where special extinguishing equipment, such as portable turrets, deluge sets and monitor towers are available, access distances may be governed by their effective reach with available water supplies.

(c) Fire lanes suitable for fire department operation shall be provided as outlined in 3201. Fire lanes shall be kept unobstructed. They shall have an all-weather surface sufficiently strong to support fire apparatus, and should be of sufficient width to permit maneuvering of motorized fire apparatus.

(d) Pile heights should be limited. Heights in excess of 20 feet seriously restrict effective extinguishing operations. Air drying

stickered piles are subject to a more rapid fire involvement and should be kept as low as possible.

34. Exposure Protection

340. Exposure to the Yard

3401. Yard areas should be separated from plant operations and other structures so that fire exposure into the yard will be minimized. Minimum separation should be by means of clear space permanently available for fire fighting operations (see 3201), and the clear space width should be based upon the severity of exposure, which will vary with the area, height, occupancy, construction and protection of the exposing structure, and the type of piling and height of adjacent piles.

3402. Unsprinklered manufacturing buildings and other large structures with combustible contents represent a severe exposure to yard storage unless the exterior walls have the necessary fire resistance to act as a fire separation and are essentially absent of unprotected openings. In general, unsprinklered sawmills, planing mills and similar buildings without essentially blank walls, should be separated from yard storage by a clear space as required by NFPA No. 80A, Protection of Buildings from Exterior Fire Exposures.

3403. Fully sprinklered structures present a lesser exposure hazard. Automatic sprinkler protection is desirable in all operating and principal storage buildings. Separation consideration between yards and sprinklered buildings will generally be determined by the seriousness of the exposure from the yard. See 341.

3404. Forest, brush, and grass fire exposure should be minimized by providing adequate clear space which is carefully kept free of combustible vegetation. Clear space widths at least equivalent to fire lanes should be provided for grass exposures, and clear space widths of at least 100 feet should be provided for light brush exposures. In forested areas a wider clear space should be provided.

341. Exposure from the Yard

3411. Fire exposure to adjacent structures and nearby property constitutes one of the major fire protection problems of lumberyard operations which can be solved satisfactorily only by cooperation between adjacent property owners. The authority having jurisdiction should be consulted in all cases.

3412. The special lumberyard protection facilities, as provided under section 33, furnish a reasonable degree of protection

against direct radiated heat through a combination of special protection facilities and controlled storage methods. It should be recognized, however, that these facilities cannot be expected to cope with adverse weather conditions and flying brands. Also, in situations where yard materials and storage methods need the special protection facilities recommended under section 33 but where such protection, which contemplates powerful water supplies and fire department manpower and equipment that can use these supplies, is not available, exposure from the yard creates serious conflagration potential. Where these conditions prevail, additional protection against lumberyard exposure should be provided as may be practical through one or more of the following:

(a) By providing greater clear space.

(b) By use of barrier walls of such fire-resistive properties and stability that the passage of flames and heat can be effectively prevented for a prolonged period of time.

(c) By employing perimeter piling methods that will furnish the equivalent of barrier walls, i.e., materials of greatest thickness and green flat-piled stock.

(d) By use of wall construction for exposed structures having adequate fire resistance.

(e) By use of automatic sprinkler systems specially designed for protection of the exposed structures.

35. Operational Fire Prevention

3501. The storage site should be reasonably level, solid ground, preferably paved or surfaced with material such as cinders, fine gravel or stone. Refuse or sawdust-filled land, swampy ground, or areas where the hazard of underground fire is present, should not be used.

3502. Weeds, grass and similar vegetation should be prevented throughout the entire yard and should be sprayed as often as needed with an acceptable herbicide or ground sterilizer or grubbed out. Dead weeds should be removed after destruction. Weed burners should not be used.

3503. Sawdust, chips and other debris should be removed from piling areas as frequently as needed to prevent accumulation. Good housekeeping should be maintained at all times, including regular and frequent cleaning of materials handling equipment.

3504. Smoking should be prohibited except in specified safe locations. "No Smoking" signs should be posted in the yard except

in specific locations designated as safe for smoking, and signs permitting smoking should be posted in those areas. Smoking should be specifically prohibited in and around railroad cars.

3505. Access into the yard areas by unauthorized persons should be prohibited. Where needed, storage areas should be enclosed with a suitable fence equipped with gates located as necessary to permit entry of fire department apparatus.

3506. Miscellaneous occupancy hazards such as vehicle storage and repair shops, cutting and welding operations, flammable liquid storage, liquefied petroleum gas storage, and similar operations should be safeguarded in accordance with recognized good practice. Refer to various NFPA standards applicable to specific occupancy hazards.

3507. Vehicles and other power devices should be of an approved type, safely maintained and operated. Vehicle fueling operations should be conducted in specified safe locations, isolated from storage areas and principal operating buildings. (Refer to NFPA No. 505, Powered Industrial Trucks.)

3508. All electrical equipment and installation should conform to the provisions of NFPA No. 70, the National Electrical Code, or the National Electrical Safety Code, National Bureau of Standards.

3509. Salamanders, braziers, open fires and similar dangerous heating arrangements should be prohibited. Heating devices should be limited to an approved type of equipment installed in an approved manner.

3510. Suitable safeguards should be provided to minimize the hazard of sparks from such equipment as refuse burners, boiler stacks, vehicle exhausts, and locomotives. Burning of shavings, sawdust and refuse materials should be conducted only in an approved enclosed refuse burner equipped with an approved spark arrester and located at a safe distance from the nearest point of any yard. See NFPA No. 82, Incinerators and Rubbish Handling, for small rubbish burners. The design and location of large burners presents special problems and the authority having jurisdiction should be consulted.

3511. Stacks from solid fuel-burning furnaces and boilers should be equipped with spark arresting equipment to prevent hot sparks from reaching the ground, and consideration should be given to spark hazard in determining the height of such stacks.

3512. Solid fuel-fired steam locomotives, cranes and similar equipment entering or operating in yards should be equipped with heavy screening with hinged openings between the mud ring and the flare of the ash pan to prevent hot coals from dropping from the ash pan. It is recommended that front-end screens of coal-fired locomotives be examined at frequent intervals. Oil-fired steam equipment should be provided with fully enclosed drip pans to prevent burning oil from escaping. It is recommended that diesel locomotives be equipped with approved spark arresters or other devices to prevent the escape of glowing carbon particles from the exhausts.

3513. If yard storage areas are located in regions highly susceptible to lightning strikes, consideration should be given to the installation of lightning protection on masts or towers to provide area protection. (See NFPA No. 78, Lightning Protection Code.)

3514. No cutting, welding or other use of open flames or spark-producing equipment should be permitted in the storage area unless by an approved permit system.

PART II

OUTDOOR STORAGE OF TIES, POLES, PILES, POSTS AND OTHER SIMILAR FOREST PRODUCTS AT PRESSURE TREATING PLANT YARDS

NOTE: Outdoor lumber and timber storage are covered in NFPA No. 47, Recommended Safe Practices for Retail and Wholesale Lumber Storage Yards. Outdoor storage of lumber and timber at other than retail or wholesale yards is covered under Part I of these recommended safe practices.

Chapter 1. Purpose

11. The intent of these recommendations is to provide fire protection guidance to minimize the fire hazard in yard storage areas containing treated and untreated ties, poles, piles, posts and other similar forest products in yards connected with pressure treating plants but not including the treating buildings, processes or storage of treating materials. Each individual property will have its own special conditions of yard use, stock handling methods and topography. For this reason, only basic fire protection principles are recommended here that are intended to be applied with due consideration of all local factors involved.

Chapter 2. Definitions

21. **Ties** as used herein shall include ties, poles, piles, posts and other similar forest products. Black ties are those pressure impregnated with oil-type preservatives.

22. **Yard** shall mean the outdoor areas where ties and other similar forest products, as described in section 11, are stored outside buildings.

23. **Clear Space** shall mean any area free of combustible materials. This does not preclude the storage of noncombustible materials that will not transmit an exposure fire.

24. **Fire Lane** shall mean a clear space suitable for fire fighting operations by motorized fire apparatus.

25. **Alleyway** shall mean an accessible clear space between storage piles or groups of piles suitable for housekeeping operations, visual inspection of piling areas and initial fire fighting operations.

Chapter 3. Tie Storage Yards

31. General

3101. Fire loss experience in storage yards indicates that large undivided piles, congested storage conditions, delayed fire detection, inadequate fire protection and ineffective fire fighting tactics are the principal factors that allow lumberyard fires to reach serious proportions. The fire hazard potential inherent in lumber storage operations with large quantities of combustible material can best be controlled by a positive fire prevention program under the direct supervision of top management and should include:

(a) Selection, design and arrangement of storage yard area and handling equipment based upon sound fire prevention and protection principles.

(b) Facilities for early fire detection, transmission of alarm and fire extinguishment.

(c) Fire lanes to separate large piles and provide access for effective fire fighting operations.

(d) Separation of yard storage from mill operations and other exposing properties.

(e) Regular yard inspections by trained personnel, including an effective fire prevention maintenance program.

32. Basic Tie Yard Protection

3201. In all tie storage operations, provision should be made for early fire detection and extinguishment. This requires watchman and alarm service, fire brigade manpower and extinguishing equipment, and ready access by means of fire lanes into all parts of the storage area so that fire extinguishing equipment can be promptly brought to the site of the fire.

Alleyways should be unobstructed, of sufficient width for hand or cart fire hose laying operations. A minimum alleyway width of four feet is recommended. Alleyways must be spaced so that effective action from initial fire fighting operations can be obtained. With relatively open piling (piling that will permit penetration by fire extinguishing streams) this can usually be accomplished by providing a four foot or greater width alleyway between alternate rows of tie piles (see Figure 1). Flat crib-style piling without space between piles so as to form solid packed rows would require a four foot or greater width alleyway between each row. Where piling area does not permit a four foot or wider alleyway between each such row, the length of the rows (distance between fire lanes) should be held to 75 feet or less. In no event should such alleyways be reduced to less than two feet in width (see Figure 2).

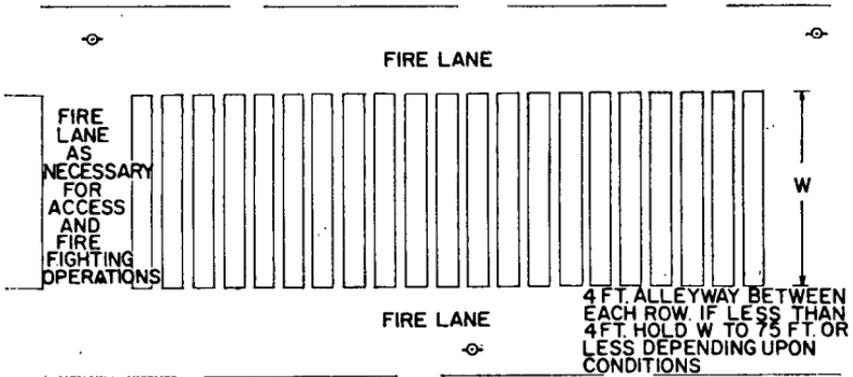


Figure 1. Relatively Open Piling Methods

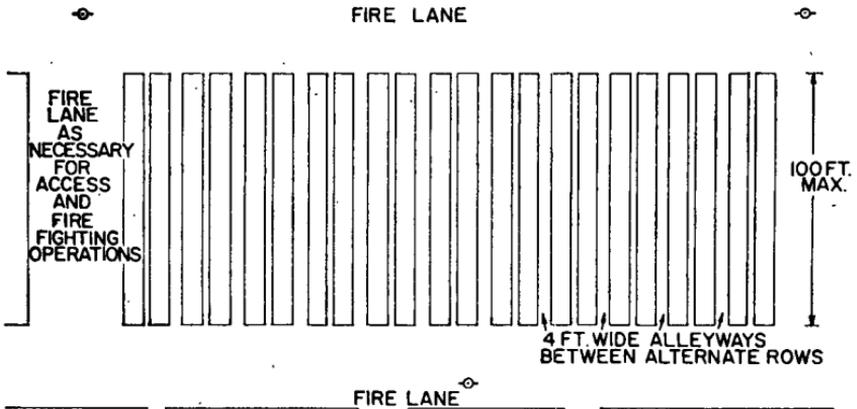


Figure 2 Crib Style Piling into Solid Rows

3202. When a fire is discovered, no matter how small, the public fire department and plant fire brigade should be notified at once. The telephone number of the fire department and the location of the nearest fire alarm box should be posted conspicuously in several locations in the yard and buildings.

3203. In storage yards, a reliable means for prompt transmission of fire alarms to public fire departments and private fire brigades should be provided at convenient and accessible locations in the yard.

3204. It is recommended that standard, hourly watchman service be maintained throughout the night and during all non-operating periods. Watchmen must be competent and rounds should be supervised by an approved central station, watchman's time detector or recorded by a portable watch clock.

3205. Watchmen and other employees should be fully instructed in the proper procedure of transmitting a fire alarm and in the use of all fire protection equipment (refer to Guard Service, NFPA No. 601, and Guard Operations, NFPA No. 601A).

3206. It is recommended that a fire brigade be organized. It should be well trained and adequately equipped to combat fire while the public fire department is responding to the alarm. Refer to NFPA No. 27, Private Fire Brigades, and to the NFPA Industrial Fire Brigades Training Manual.

3207. Portable fire extinguishers suitable for the fire hazard involved should be provided at convenient, conspicuously accessible locations in the yard. Where practicable, approved portable fire extinguishing equipment should be placed so that maximum travel distance to the nearest unit should not exceed 75 feet. (See NFPA No. 10, Installation of Portable Fire Extinguishers, and NFPA No. 10A, Maintenance and Use of Portable Fire Extinguishers.) It is recommended that approved fire extinguishers of suitable type be provided on all power vehicles and units, including haulage or private locomotives in the yard.

3208. A yard fire hydrant system connected to an ample water supply should be provided. For basic fire protection, the system should be capable of supplying at least four 2½-inch hose streams simultaneously (1,000 gpm minimum). Where large-scale fire fighting operations may be expected, larger water supplies with adequate mains are needed. See section 33.

Hydrants should be of an approved type with the same hose threads as used by the local fire department and preferably located at fire lane intersections. For early extinguishment with basic fire

protection, hydrants should be so spaced with sufficient 2½-inch hose attached to permit rapid hose laying to all parts of the piling areas. For this reason, it is recommended that hydrants be spaced at about 250-foot intervals so that any part of the yard can be reached with 200 feet of hose. A hydrant hose house with at least 200 feet of fire hose and auxiliary equipment shall be provided at each hydrant. (See NFPA No. 24, Outside Protection.)

Hydrants and hose houses shall be kept free of obstructions at all times.

3209. All-weather roadways capable of supporting fire department apparatus should be provided to the plant and yard from public highways.

33. Special Tie Yard Protection

3301. Tie yards containing low-piled storage, small amounts of black ties and well-separated treating facilities present minimum hazards that generally require only the basic protection provisions of section 32 for fire control. High piling over extensive areas, congested storage, and large amounts of black tie storage present increased hazards which require additional safeguards and protection facilities. In yards requiring more than the basic protection provisions of section 32 for fire control, the following provisions are recommended as a guide. The relative importance of these provisions and the degree to which they may be needed will vary with yard conditions and the authority having jurisdiction should be consulted in all cases:

(a) Powerful water supplies and large mains should be provided where public or private fire department response, with manpower and equipment that can use these supplies, is available. Large stream equipment such as portable turrets and deluge sets require 750 to 1,000 gpm for each appliance. Monitor towers may require supplies in excess of 1,000 gpm for each unit. In large yards where the hazard is severe, many of these devices may be operated simultaneously.

(b) Fire lanes suitable for fire department operations shall be provided with storage arranged so that no part of the occupied area is more than 50 feet distant in any direction from access by motorized fire fighting equipment. Where special extinguishing equipment, such as portable turrets, deluge sets and monitor towers are available, access distances may be governed by their effective reach with available water supplies.

(c) Fire lanes suitable for fire department operation shall be provided as outlined in 3201. Fire lanes shall be kept unob-

structed. They shall have an all-weather surface sufficiently strong to support fire apparatus, and should be of sufficient width to permit maneuvering of motorized fire apparatus.

(d) Pile heights should be limited. Heights in excess of 20 feet seriously restrict effective extinguishing operations.

(e) Black ties should not be intermixed with untreated products. A 100-foot clear space should be maintained between black tie storage and untreated storage.

34. Exposure Protection

340. Exposure to the Yard

3401. Yard areas should be separated from plant operations and other structures so that fire exposure into the yard will be minimized. Minimum separation should be by means of clear space permanently available for fire fighting operations (see 3201), and the clear space width should be based upon the severity of exposure, which will vary with the area, height, occupancy, construction and protection of the exposing structure, and the type of piling and height of adjacent piles.

3402. Unsprinklered manufacturing buildings and other large structures with combustible contents represent a severe exposure to hard storage unless the exterior walls have the necessary fire resistance to act as a fire separation and are essentially absent of unprotected openings. In general, unsprinklered treating plants, adzing mills and similar buildings without essentially blank walls, should be separated from yard storage by a clear space as required by NFPA No. 80A, Protection of Buildings from Exterior Fire Exposures.

3403. Fully sprinklered structures present a lesser exposure hazard. Automatic sprinkler protection is desirable in all operating and principal storage buildings. Separation consideration between yards and sprinklered buildings will generally be determined by the seriousness of the exposure from the yard. See 341.

3404. Forest, brush, and grass fire exposure should be minimized by providing adequate clear space which is carefully kept free of combustible vegetation. Clear space widths at least equivalent to fire lanes should be provided for grass exposures, and clear space widths of at least 100 feet should be provided for light brush exposures. In forested areas a wider clear space should be provided.

341. Exposure from the Yard

3411. Fire exposure to adjacent structures and nearby property constitutes one of the major fire protection problems of lumberyard operations which can be solved satisfactorily only by cooperation between adjacent property owners. The authority having jurisdiction should be consulted in all cases.

3412. The special tie yard protection facilities as provided under section 33 furnish a reasonable degree of protection against direct radiated heat through a combination of special protection facilities and controlled storage methods. It should be recognized, however, that these facilities cannot be expected to cope with adverse weather conditions and flying brands. Also, in situations where yard materials and storage methods need the special protection facilities recommended under section 33 but where such protection, which contemplates powerful water supplies and fire department manpower and equipment that can use these supplies, is not available, exposure from the yard creates serious conflagration potential. Where these conditions prevail, additional protection against lumberyard exposure should be provided as may be practical through one or more of the following:

(a) By providing greater clear space.

(b) By use of barrier walls of such fire-resistive properties and stability that the passage of flames and heat can be effectively prevented for a prolonged period of time.

(c) By employing perimeter piling methods that will furnish the equivalent of barrier walls, i.e., materials of greatest thickness and green flat-piled stock.

(d) By use of wall construction for exposed structures having adequate fire resistance.

(e) By use of automatic sprinkler systems specially designed for protection of the exposed structures.

35. Operational Fire Prevention

3501. The storage site should be reasonably level, solid ground, preferably paved or surfaced with material such as cinders, fine gravel or stone. Refuse of sawdust-filled land, swampy ground or areas where the hazard of underground fire is present should not be used.

3502. Weeds, grass and similar vegetation should be prevented throughout the entire yard and should be sprayed as often as needed with an acceptable herbicide or ground sterilizer or grubbed out. Dead weeds should be removed after destruction. Weed burners should not be used.