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**BUREAU OF LABOR STATISTICS**  
ETHELBERT STEWART, Commissioner

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BUREAU OF LABOR STATISTICS } . . . . No. 447

SAFETY CODE SERIES

**SAFETY CODE**  
**FOR RUBBER MILLS AND**  
**CALENDERS**

INTERNATIONAL ASSOCIATION OF INDUSTRIAL  
ACCIDENT BOARDS AND COMMISSIONS AND THE  
NATIONAL SAFETY COUNCIL, RUBBER SECTION  
SPONSORS

RECOMMENDED AMERICAN PRACTICE  
Approved March, 1927  
American Engineering Standards Committee



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# BULLETIN OF THE U. S. BUREAU OF LABOR STATISTICS

NO. 447

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JUNE, 1927

## SAFETY CODE FOR RUBBER MILLS AND CALENDERS

### INTRODUCTION

The mechanical hazards involved in the rubber industry are of such a character that the American Engineering Standards Committee has recognized the necessity of standardized practice in the safeguarding and the quick stopping of all machines used in breaking down, washing, milling, cutting, molding, and vulcanizing of rubber, together with calenders, spreaders, coaters, and dryers, and similar machinery used in the manufacture of rubber goods.

One purpose of this code is to serve as a guide to State or other supervising authorities. It is also intended for use directly by the concerns operating machines of this or a similar character and may be adopted by any manufacturing concern as a standard to be followed by its superintendents, foremen, designers, mechanics, and operators. It is also intended for use by machinery concerns manufacturing rubber-working machinery.

### SCOPE

The entire code shall cover the mechanical hazards encountered in the manufacture of rubberized fabrics, rubber tires, fire and garden hose, footwear, molded rubber goods, rubber belting, reclaimed rubber, rubber solution and products made therefrom, and miscellaneous rubber materials; shall cover the machines used in breaking down, washing, milling, cutting, molding, and vulcanizing of rubber, together with calenders, spreaders, coaters, and dryers, and other machinery used in the manufacture of rubber sheeting; special machines used in the manufacture of rubber tires included, but spinning and weaving fabrics excluded.

On account of the broad field to be covered, it was decided by the sectional committee to consider in this preliminary issue the safeguarding of mills and calenders at the point of operation, and this is the limited work that is dealt with in the following rules.

### INTERPRETATIONS AND EXCEPTIONS

The purpose of this code is to provide reasonable safety for life, limb, and health. In cases of practical difficulty or unnecessary hardship, the enforcing officers or body may grant exceptions from the literal requirements of this code, or permit the use of other devices or methods, but only when it is clearly evident the equivalent protection is thereby secured.

Laboratory equipment varies so much from manufacturing equipment in size, speeds, and heights that exceptions may be made from requirements indicated in this code, provided equivalent protection is given.

This code does not apply to the internal type mixer, washer, and masticator, except in so far as there may be exposed in-running rolls attached or used in connection with this type of equipment.

**NOTE.**—To secure the uniform application of this code, enforcing officers are urged before rendering decisions on disputed points to consult the committee which formulated it—the Committee on Safety Code for Rubber Machinery, in care of American Engineering Standards Committee, 29 West Thirty-ninth Street, New York City.

## DEFINITIONS

The word “shall” is to be understood as mandatory and the word “should” as advisory.

The word “approval” means approved by the authority having jurisdiction.

The word “bite” means the point of meeting between any two in-running rolls.

The term “mill” shall mean machines with rolls used in the breaking down, cracking, washing, grating, mixing, refining, and warming of rubber or rubber compounds.

The term “calender” shall mean machines with rolls used for frictioning, sheeting, coating, and spreading of rubber or rubber compounds.

## PART 1.—NEW AND EXISTING INSTALLATIONS

### Rule 100. New installations.

After the date on which this code becomes effective, all new installations shall be in conformity with the intent and purpose of this code.

### Rule 101. Existing installations.

All existing installations within a period of three years from the date this code becomes effective shall be made to comply with the intent and purpose of these requirements consistent with the physical characteristics of the drive and the general characteristics of the plant layout.

**NOTE.**—It is the purpose of rule 101 to recognize the difficulty of bringing existing installations up to the full intent and purpose of this code without incurring an expense inconsistent with the results obtained.

### Rule 102. Reference to other codes.

(a) *Lighting.*—Rubber mills and calendars should be so located with respect to sources of both natural and artificial light that light of sufficient intensity will fall on the work; direct or reflected glare and shadows, including moving shadows, should be avoided.

**NOTE.**—For specific requirements see Code of Lighting for Factories, Mills, and Other Work Places (American standard), obtainable from the American Engineering Standards Committee and from the Illuminating Engineering Society, both of 29 West Thirty-ninth Street, New York City.

(b) *Belt, pulley, gear, and shaft guards.*—All belts, pulleys, gears, shafts, and other moving parts shall be guarded as required

by the Safety Code for Mechanical Power-Transmission Apparatus (American standard), obtainable from the American Engineering Standards Committee, of 29 West Thirty-ninth Street, New York City, or in accordance with the State laws of the particular operating States.

(c) *Switches and other electrical apparatus.*—All switches and other electrical apparatus shall be of a type or guarded as required by the National Electrical Safety Code (American standard), issued by the United States Bureau of Standards, Washington, D. C., or in accordance with the State laws of the particular operating States.

### GENERAL

#### Rule 103. Mill-roll height.

All mills should be installed so that the top of the front roll is not less than forty-six (46) inches above the working floor level or platform on which the operator stands, irrespective of the size of the mill.

### SAFETY-TRIP CONTROLS AND QUICK-STOP FACILITIES

#### Rule 110. Safety-trip control—Mills.

(a) A safety-trip rod or tight-wire cable for each individual mill shall be provided front and back of all mills, extending the length of the face of the rolls. It shall operate sensitively if it is pushed or if it is pulled.

(b) The normal location of the safety-trip rod over the front roll shall be two (2) inches to four (4) inches in from the edge of the front roll and not more than sixty-nine (69) inches above the working floor level on which the operator stands, with provision made for adjustment of three (3) inches either up or down. (See illustration No. 1.)

(c) The normal location of the safety-trip rod at the back of the mill shall be two (2) inches to four (4) inches in from the edge of the back roll and shall be in the same horizontal plane as the safety-trip bar over the front roll, and the length of the lever from fulcrum shall be the same.

#### Rule 111.

The fixed center rod or tie running the length of the roll, sometimes used for construction purposes, shall be omitted.

#### Rule 112.

The locations of safety trips apply to all sizes of mills.

#### Rule 113. Dry grinding.

(a) In dry grinding and in mixing processes, where the material is shoveled into a trough over the bite of the rolls, the foregoing rules 110 to 112, inclusive, will not apply, provided the throat of the trough over the bite of the rolls is screened with heavy three (3) inch by three (3) inch mesh of not less than No. 8 gauge wire and the trough and the screen are made a permanent fixed part of the machines and are so designed with regard to openings therein that it is impossible for an operator's hand, intentionally or otherwise, to come in contact with the bite of the rolls.

(b) In dry grinding processes similar in character to the above and where the machine is fed through a long trough—as, for instance, from an upper floor level—the foregoing rules 110 to 112, inclusive, will not apply, provided the trough is so designed and is of such a character that it is impossible for an operator in any manner to come in contact with the bite of the rolls.

**Rule 120. Safety-trip control—Calenders.**

(a) A safety-trip rod or a tight-wire cable shall be provided across the front and the back of all calenders, extending the length of face of rolls, to operate sensitively if it is pushed or if it is pulled. This rod shall be at a height not more than sixty-nine (69) inches above the working floor level or platform on which the operator

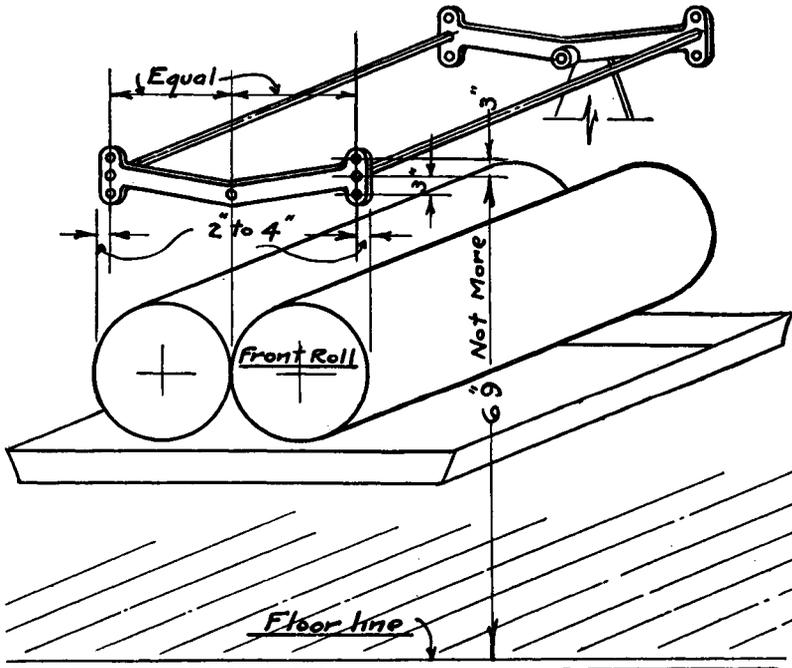


ILLUSTRATION NO. 1

stands and shall be within easy reach, with provision made for adjustment either up or down of three (3) inches in each direction. (See illustration No. 2.)

(b) On each side of all calenders and near both ends of the face of the roll there shall be a vertical tight-wire cable connecting with the bar tipping mechanism at the top and fastened to the frame within twelve (12) inches of the floor. These cables should be positioned at a distance of not more than twelve (12) inches from the face of the roll and at a distance of not less than one (1) inch from calender frame. (See illustrations Nos. 2 and 2A.)

**Rule 121.**

At the bite of in-running rolls where sheeting, duck, or other fabric is fed, a barrier should be placed across the full length of the

face of the rolls so designed and applied that the operator's fingers can not come in contact with the bite. (See illustration No. 3.)

#### DETERMINATION OF DISTANCE OF TRAVEL

##### Rule 130.

(a) Measurements on mill shall be taken on the front roll; measurements on calender shall be taken on the drive roll. All measure-

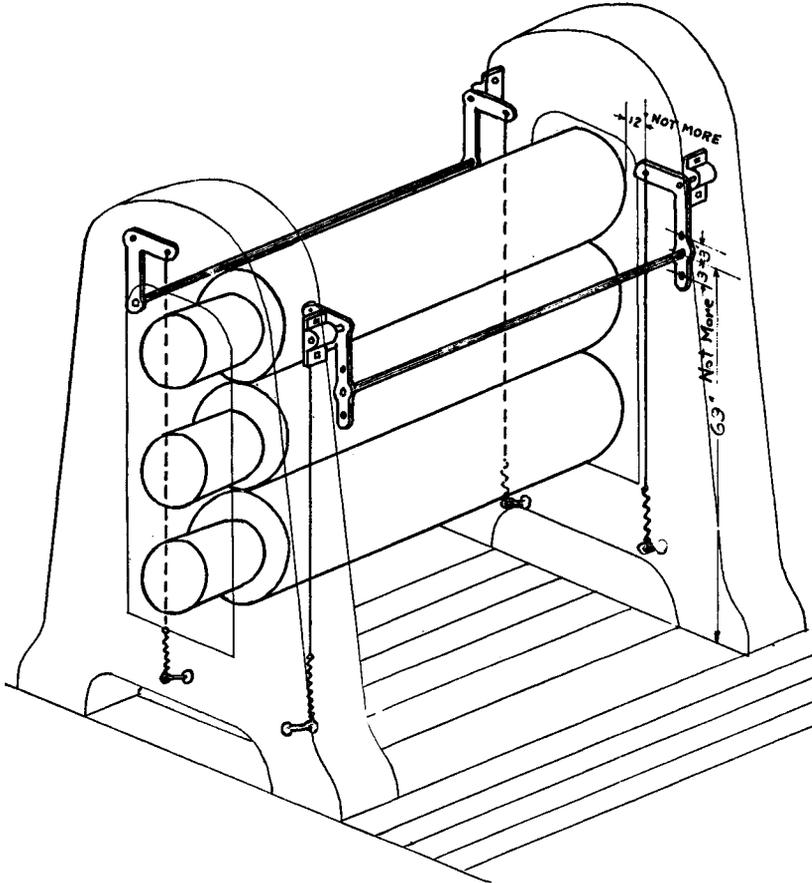


ILLUSTRATION No. 2

ments shall be taken under normal operating conditions, with rolls running idle.

(b) An approved instrument consisting of a pen or pencil or equivalent, electrically or mechanically operated, shall be used in measuring distances traveled. This instrument shall be so designed and attached that the pen or pencil will come in contact with a strip of paper coincidentally with the tripping of the safety control. The strip of paper shall be wrapped around the outside of the mill or calender roll. (See illustrations Nos. 4 and 4A.)

## STOPPING LIMITS—INDIVIDUALLY DRIVEN MILLS

**Rule 131.**

(a) Every mill having a diameter of the front roll up to and including sixteen and one-half ( $16\frac{1}{2}$ ) inches and running empty at any speed shall be stopped within a distance of not more than ten (10) inches' travel after the safety is tripped.

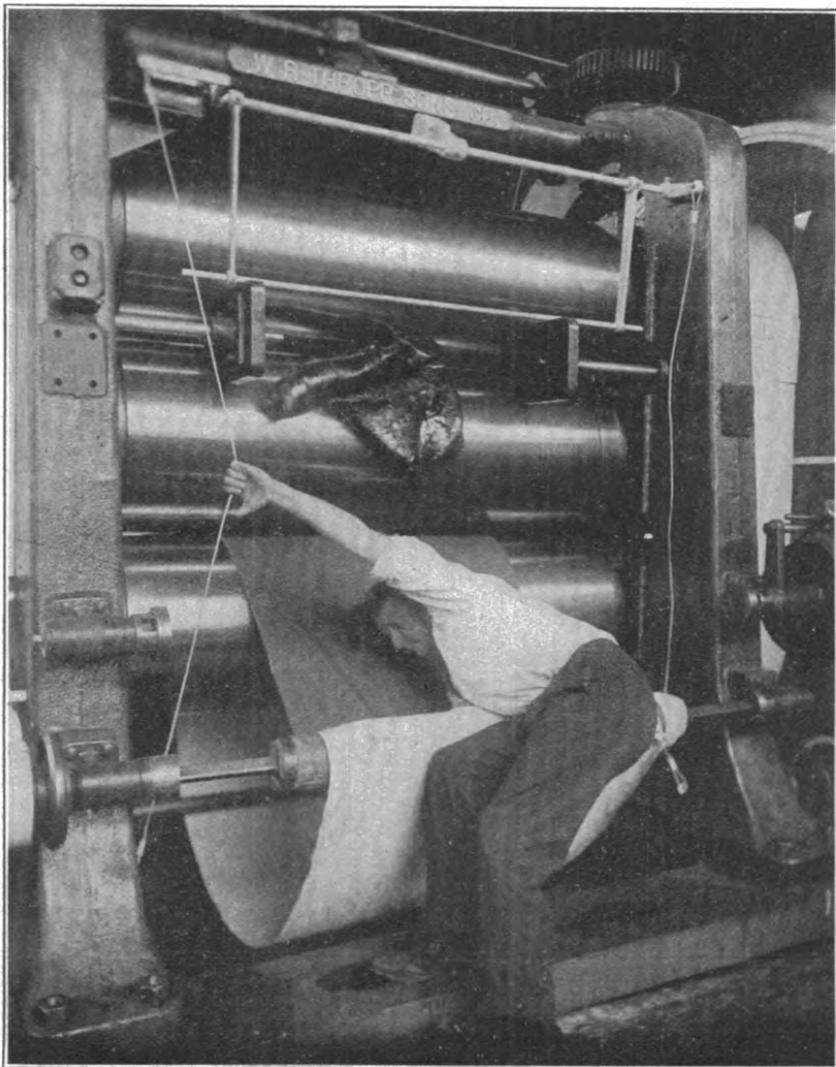


ILLUSTRATION No. 2A

(b) Every mill having a diameter of the front roll over sixteen and one-half ( $16\frac{1}{2}$ ) inches and up to and including twenty-two and one-half ( $22\frac{1}{2}$ ) inches and running empty at any speed shall be stopped within a distance of not more than fifteen (15) inches' travel after the safety is tripped.

(c) Every mill having a diameter of the front roll over twenty-two and one-half ( $22\frac{1}{2}$ ) inches and up to and including twenty-six (26) inches and running empty at any speed shall be stopped within a distance of not more than eighteen (18) inches' travel after the safety is tripped.

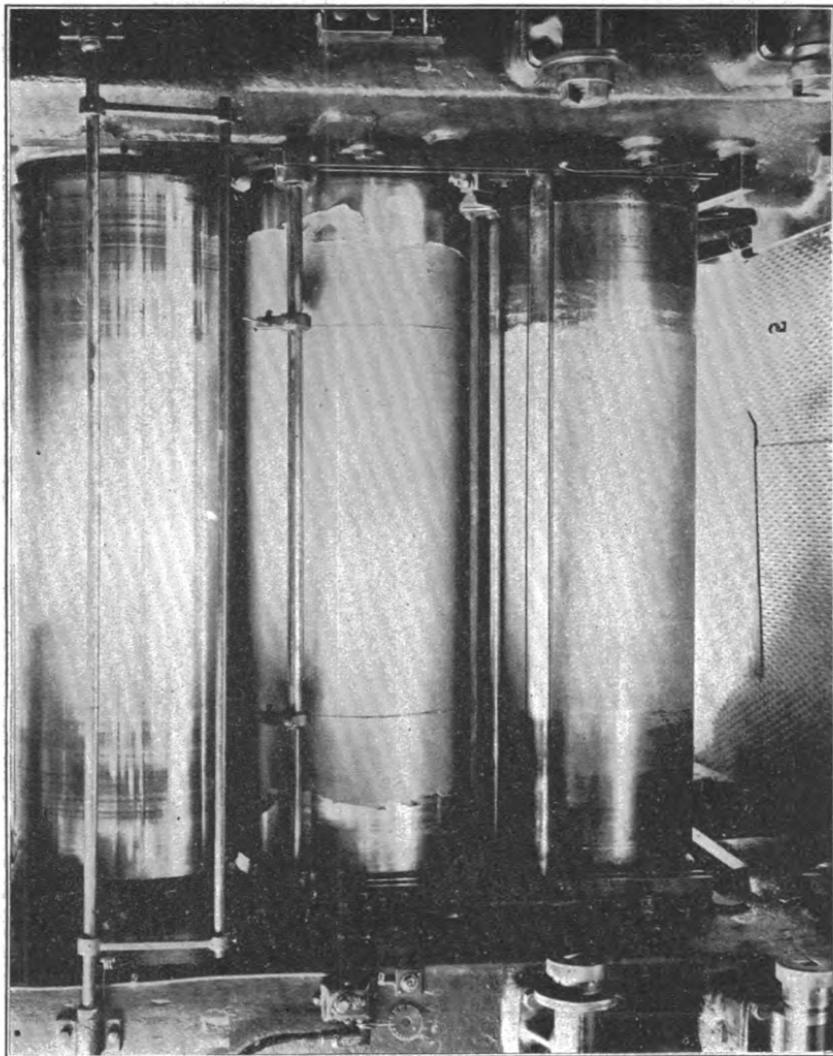


ILLUSTRATION No. 3

### STOPPING LIMITS—MILLS DRIVEN IN GROUPS

#### Rule 132.

(a) Mills driven in groups of two or more and having a diameter of the front roll up to and including sixteen and one-half ( $16\frac{1}{2}$ ) inches and running empty at any speed shall be stopped within a distance of not more than eighteen (18) inches' travel after the safety is tripped.

(b) Mills driven in groups of two or more and having a diameter of the front roll over sixteen and one-half ( $16\frac{1}{2}$ ) inches and up to

and including twenty-two and one-half ( $22\frac{1}{2}$ ) inches and running empty at any speed shall be stopped within a distance of not more than twenty-four (24) inches' travel after the safety is tripped.

(c) Mills driven in groups of two or more and having a diameter of the front roll over twenty-two and one-half ( $22\frac{1}{2}$ ) inches and

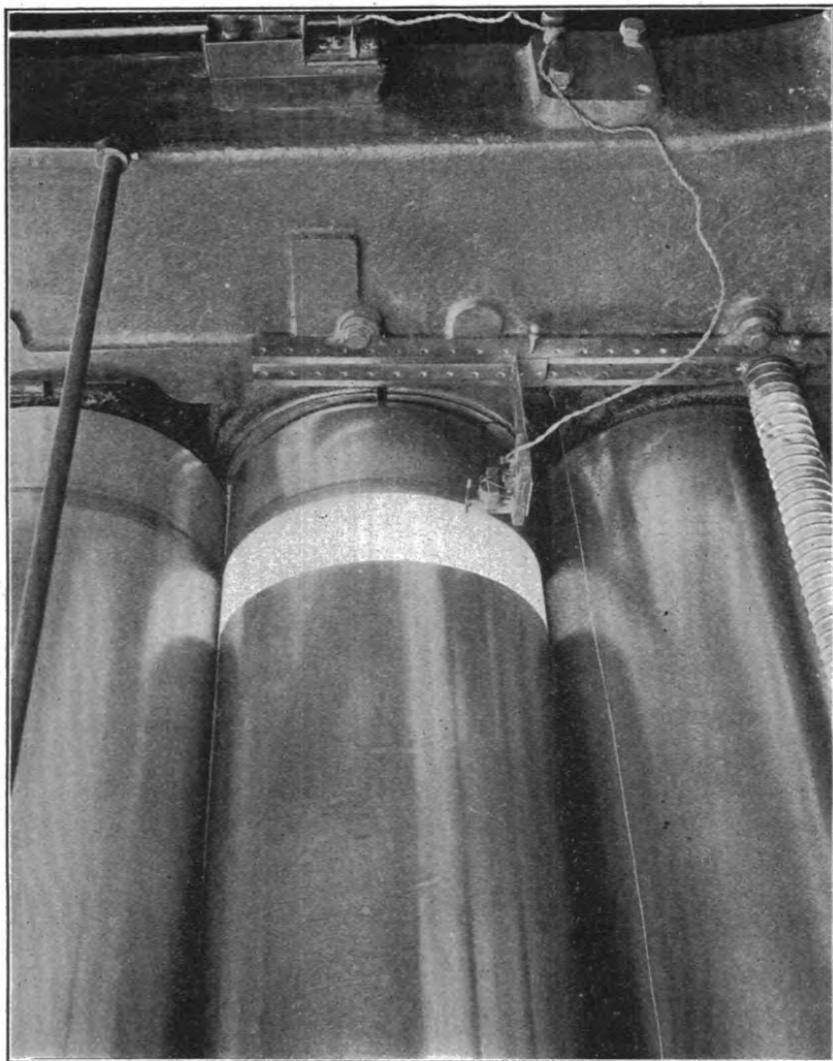


ILLUSTRATION No. 4

up to and including twenty-six (26) inches and running empty at any speed shall be stopped within a distance of not more than thirty-six (36) inches' travel after the safety is tripped.

#### STOPPING LIMITS—INDIVIDUALLY AND GROUP DRIVEN CALENDERS

##### Rule 135.

Every calender, irrespective of the size of the rolls, shall be stopped within a distance as shown below on the chart when meas-

ured at the maximum peripheral speed. Illustration: Suppose the roll is going at one hundred and twenty-five (125) feet per minute, then by reading the chart we note the stopping distance should not be more than thirty (30) inches.

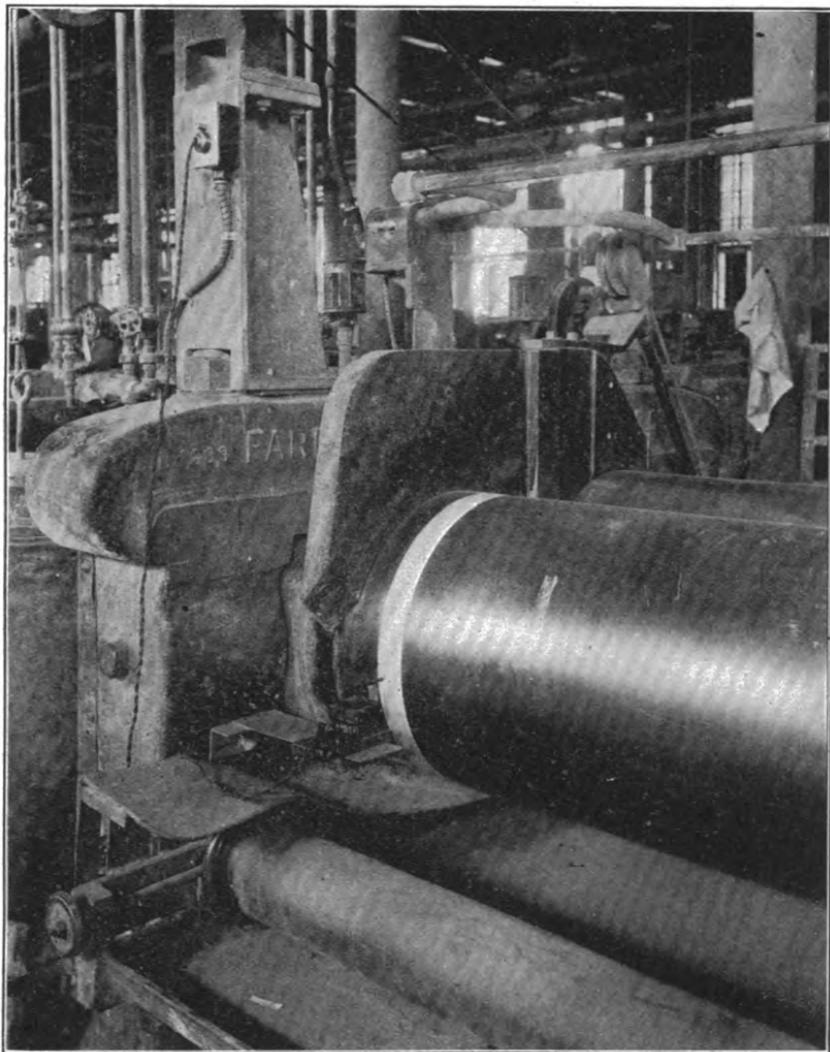


ILLUSTRATION No. 4A

Calenders the drive roll of which travels at a maximum peripheral speed of fifty (50) feet per minute or less shall be stopped within a distance of not more than twelve (12) inches measured on the drive roll after the safety is tripped.

Speeds above two hundred (200) feet per minute measured on the drive roll are special and require special consideration.

## OPERATING RULES

## Rule 150.

Safety stops on mills and calenders should be tested daily, and accurate measurements of distance of travel shall be taken at least once every thirty (30) days.

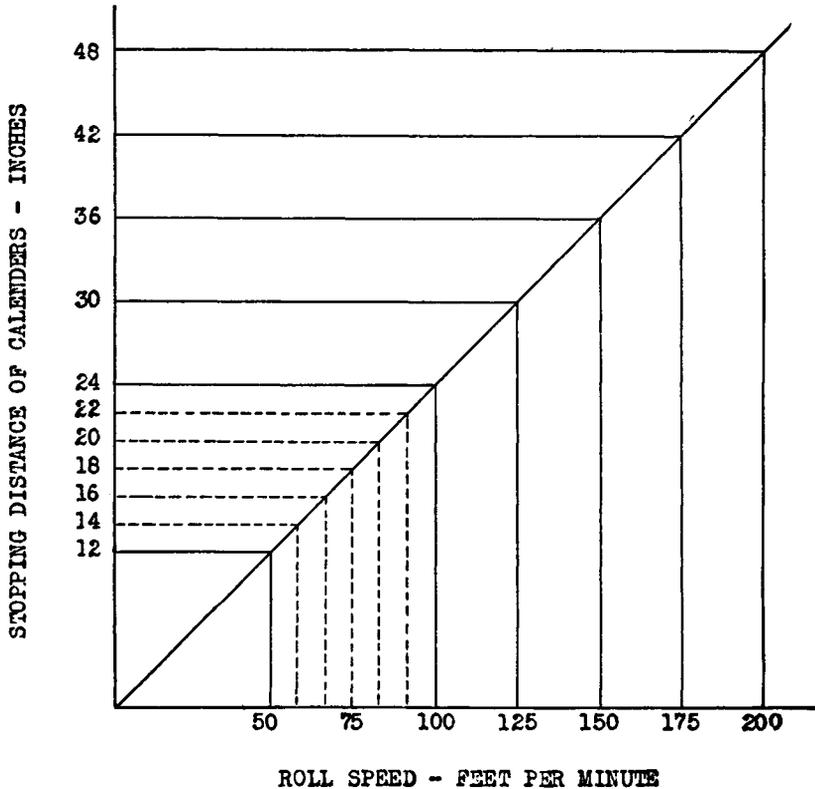


CHART TO SHOW STOPPING DISTANCE FOR VARIOUS SPEEDS

## PART 2.—DISCUSSION

It is realized that the quick stopping of mills and calenders is a very important factor in accident prevention in that it limits the injury to a worker if caught between the rolls. At the present time, due to the different type of drives and controls for stopping, there is a wide variation in the distance that a roll will travel after the safety trip has been operated.

Some form of braking device is absolutely necessary. With stock in the mill or calender the stop is much quicker than when the mill or calender is running empty, but in order to have a standard condition for testing and comparison it is necessary to make tests for quick stopping with all the equipment running empty.

A great many tests have been made to determine the distance a roll will travel after the safety control is operated, and the rules given herein show what may reasonably be expected with average good conditions and with as quick a stop as can be obtained without seriously jarring the machinery or breaking some part of the equipment.

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## LIST OF BULLETINS OF THE BUREAU OF LABOR STATISTICS

*The following is a list of all bulletins of the Bureau of Labor Statistics published since July, 1912, except that in the case of bulletins giving the results of periodic surveys of the bureau only the latest bulletin on any one subject is here listed.*

*A complete list of the reports and bulletins issued prior to July, 1912, as well as the bulletins published since that date, will be furnished on application. Bulletins marked thus (\*) are out of print.*

### **Conciliation and Arbitration (including strikes and lockouts).**

- \*No. 124. Conciliation and arbitration in the building trades of Greater New York. [1913.]
- \*No. 133. Report of the industrial council of the British Board of Trade in its inquiry into industrial agreements. [1913.]
- \*No. 139. Michigan copper district strike. [1914.]
- No. 144. Industrial court of the cloak, suit, and skirt industry of New York City. [1914.]
- No. 145. Conciliation, arbitration, and sanitation in the dress and waist industry of New York City. [1914.]
- \*No. 191. Collective bargaining in the anthracite coal industry. [1916.]
- \*No. 198. Collective agreements in the men's clothing industry. [1916.]
- No. 233. Operation of the industrial disputes investigation act of Canada. [1918.]
- No. 255. Joint industrial councils in Great Britain. [1919.]
- No. 283. History of the Shipbuilding Labor Adjustment Board, 1917 to 1919.
- No. 287. National War Labor Board: History of its formation, activities, etc. [1921.]
- No. 303. Use of Federal power in settlement of railway labor disputes. [1922.]
- No. 341. Trade agreement in the silk-ribbon industry of New York City. [1923.]
- No. 402. Collective bargaining by actors. [1926.]
- No. 419. Trade agreements, 1925.

### **Cooperation.**

- No. 313. Consumers' cooperative societies in the United States in 1920.
- No. 314. Cooperative credit societies in America and in foreign countries. [1922.]
- No. 437. Cooperative movement in the United States in 1925 (other than agricultural).

### **Employment and Unemployment.**

- \*No. 109. Statistics of unemployment and the work of employment offices in the United States. [1913.]
- No. 172. Unemployment in New York City, N. Y. [1915.]
- \*No. 183. Regularity of employment in the women's ready-to-wear garment industries. [1915.]
- \*No. 195. Unemployment in the United States. [1916.]
- No. 196. Proceedings of the Employment Managers' Conference held at Minneapolis, Minn., January, 1916.
- \*No. 202. Proceedings of the conference of Employment Managers' Association of Boston, Mass., held May 10, 1916.
- No. 206. The British system of labor exchanges. [1916.]
- \*No. 227. Proceedings of the Employment Managers' Conference, Philadelphia, Pa., April 2 and 3, 1917.
- No. 235. Employment system of the Lake Carriers' Association. [1918.]
- \*No. 241. Public employment offices in the United States. [1918.]
- No. 247. Proceedings of Employment Managers' Conference, Rochester, N. Y., May 9-11, 1918.
- No. 310. Industrial unemployment: A statistical study of its extent and causes. [1922.]
- No. 409. Unemployment in Columbus, Ohio, 1921 to 1925.

### **Foreign Labor Laws.**

- \*No. 142. Administration of labor laws and factory inspection in certain European countries. [1914.]

### **Housing.**

- \*No. 158. Government aid to home owning and housing of working people in foreign countries. [1914.]
- No. 263. Housing by employers in the United States. [1920.]
- No. 295. Building operations in representative cities in 1920.
- No. 424. Building permits in the principal cities of the United States, 1925.

### **Industrial Accidents and Hygiene.**

- \*No. 104. Lead poisoning in potteries, tile works, and porcelain enameled sanitary ware factories. [1912.]
- No. 120. Hygiene of the painters' trade. [1913.]
- \*No. 127. Dangers to workers from dust and fumes, and methods of protection. [1913.]
- \*No. 141. Lead poisoning in the smelting and refining of lead. [1914.]
- \*No. 157. Industrial accident statistics. [1915.]
- \*No. 165. Lead poisoning in the manufacture of storage batteries. [1914.]
- \*No. 179. Industrial poisons used in the rubber industry. [1915.]
- No. 188. Report of British departmental committee on the danger in the use of lead in the painting of buildings. [1916.]
- \*No. 201. Report of committee on statistics and compensation-insurance cost of the International Association of Industrial Accident Boards and Commissions. [1916.]
- \*No. 207. Causes of death, by occupation. [1917.]
- \*No. 209. Hygiene of the printing trades. [1917.]
- No. 219. Industrial poisons used or produced in the manufacture of explosives. [1917.]
- No. 221. Hours, fatigue, and health in British munition factories. [1917.]
- No. 230. Industrial efficiency and fatigue in British munition factories. [1917.]
- \*No. 231. Mortality from respiratory diseases in dusty trades (inorganic dusts). [1918.]
- No. 234. Safety movement in the iron and steel industry, 1907 to 1917.
- \*No. 236. Effects of the air hammer on the hands of stonemasons. [1918.]
- No. 249. Industrial health and efficiency. Final report of British Health of Munition Workers Committee. [1919.]
- \*No. 251. Preventable death in the cotton-manufacturing industry. [1919.]
- No. 256. Accidents and accident prevention in machine building. [1919.]
- No. 267. Anthrax as an occupational disease. [1920.]
- No. 276. Standardization of industrial accident statistics. [1920.]
- No. 280. Industrial poisoning in making coal-tar dyes and dye intermediates. [1921.]
- No. 291. Carbon monoxide poisoning. [1921.]
- No. 293. The problem of dust phthisis in the granite-stone industry. [1922.]
- No. 298. Causes and prevention of accidents in the iron and steel industry, 1910 to 1919.
- No. 306. Occupational hazards and diagnostic signs: A guide to impairments to be looked for in hazardous occupations. [1922.]
- No. 339. Statistics of industrial accidents in the United States. [1923.]
- No. 392. Survey of hygienic conditions in the printing trades. [1925.]
- No. 405. Phosphorus necrosis in the manufacture of fireworks and the preparation of phosphorus. [1926.]
- No. 425. Record of industrial accidents in the United States to 1925.
- No. 426. Deaths from lead poisoning. [1926.]
- No. 427. Health survey of the printing trades, 1922 to 1925.
- No. 428. Proceedings of the Industrial Accident Prevention Conference, held at Washington, D. C., July 14-16, 1926.

### **Industrial Relations and Labor Conditions.**

- No. 237. Industrial unrest in Great Britain. [1917.]
- No. 340. Chinese migrations, with special reference to labor conditions. [1923.]
- No. 349. Industrial relations in the West Coast lumber industry. [1923.]
- No. 361. Labor relations in the Fairmont (W. Va.) bituminous-coal field. [1924.]
- No. 380. Postwar labor conditions in Germany. [1925.]
- No. 383. Works council movement in Germany. [1925.]
- No. 384. Labor conditions in the shoe industry in Massachusetts, 1920 to 1924.
- No. 399. Labor relations in the lace and lace-curtain industries in the United States. [1925.]

**Labor Laws of the United States (including decisions of courts relating to labor).**

- No. 211. Labor laws and their administration in the Pacific States. [1917.]
- No. 229. Wage payment legislation in the United States. [1917.]
- No. 285. Minimum-wage legislation in the United States. [1921.]
- No. 321. Labor laws that have been declared unconstitutional. [1922.]
- No. 322. Kansas Court of Industrial Relations. [1923.]
- No. 343. Laws providing for bureaus of labor statistics, etc. [1923.]
- No. 370. Labor laws of the United States, with decisions of courts relating thereto. [1925.]
- No. 408. Laws relating to payment of wages. [1926.]
- No. 434. Labor legislation of 1926.
- No. 444. Decisions of courts and opinions affecting labor, 1926. (In press.)

**Proceedings of Annual Conventions of the Association of Governmental Labor Officials of the United States and Canada.**

- No. 266. Seventh, Seattle, Wash., July 12-15, 1920.
- No. 307. Eighth, New Orleans, La., May 2-6, 1921.
- \*No. 323. Ninth, Harrisburg, Pa., May 22-26, 1922.
- No. 352. Tenth, Richmond, Va., May 1-4, 1923.
- No. 389. Eleventh, Chicago, Ill., May 19-23, 1924.
- No. 411. Twelfth, Salt Lake City, Utah, August 13-15, 1925.
- No. 429. Thirteenth, Columbus, Ohio, June 7-10, 1926.

**Proceedings of Annual Meetings of the International Association of Industrial Accident Boards and Commissions.**

- \*No. 210. Third, Columbus, Ohio, April 25-28, 1916.
- No. 248. Fourth, Boston, Mass., August 21-25, 1917.
- No. 264. Fifth, Madison, Wis., September 24-27, 1918.
- \*No. 273. Sixth, Toronto, Canada, September 23-26, 1919.
- No. 281. Seventh, San Francisco, Calif., September 20-24, 1920.
- No. 304. Eighth, Chicago, Ill., September 19-23, 1921.
- No. 333. Ninth, Baltimore, Md., October 9-13, 1922.
- No. 359. Tenth, St. Paul, Minn., September 24-26, 1923.
- No. 385. Eleventh, Halifax, Nova Scotia, August 26-28, 1924.
- No. 395. Index to proceedings, 1914-1924.
- No. 406. Twelfth, Salt Lake City, Utah, August 17-20, 1925.
- No. 432. Thirteenth, Hartford, Conn., September 14-17, 1926.

**Proceedings of Annual Meetings of International Association of Public Employment Services.**

- No. 192. First, Chicago, December 19 and 20, 1913; Second, Indianapolis, September 24 and 25, 1914; Third, Detroit, July 1 and 2, 1915.
- No. 220. Fourth, Buffalo, N. Y., July 20 and 21, 1916.
- No. 311. Ninth, Buffalo, N. Y., September 7-9, 1921.
- No. 337. Tenth, Washington, D. C., September 11-13, 1922.
- No. 355. Eleventh, Toronto, Canada, September 4-7, 1923.
- No. 400. Twelfth, Chicago, Ill., May 19-23, 1924.
- No. 414. Thirteenth, Rochester, N. Y., September 15-17, 1925.

**Productivity of Labor.**

- No. 356. Productivity costs in the common-brick industry. [1924.]
- No. 360. Time and labor costs in manufacturing 100 pairs of shoes. [1924.]
- No. 407. Labor cost of production and wages and hours of labor in the paper box-board industry.
- No. 412. Wages, hours, and productivity in the pottery industry, 1925.
- No. 441. Productivity of labor in the glass industry. [1927.] (In press.)

**Retail Prices and Cost of Living.**

- \*No. 121. Sugar prices, from refiner to consumer. [1913.]
- \*No. 130. Wheat and flour prices, from farmer to consumer. [1913.]
- \*No. 164. Butter prices, from producer to consumer. [1914.]
- No. 170. Foreign food prices as affected by the war. [1915.]
- No. 357. Cost of living in the United States. [1924.]
- No. 369. The use of cost-of-living figures in wage adjustments. [1925.]
- No. 445. Retail prices, 1890 to 1926. (In press.)

**Safety Codes.**

- No. 331. Code of lighting factories, mills, and other work places.
- No. 336. Safety code for the protection of industrial workers in foundries.
- No. 338. Safety code for the use, care, and protection of abrasive wheels.
- No. 350. Specifications of laboratory tests for approval of electric headlighting devices for motor vehicles.
- No. 351. Safety code for the construction and use of ladders.
- No. 364. Safety code for mechanical power-transmission apparatus.
- No. 375. Safety code for laundry machinery and operations.
- No. 378. Safety code for woodworking plants.
- No. 382. Code of lighting school buildings.
- No. 410. Safety code for paper and pulp mills.
- No. 430. Safety code for power presses and foot and hand presses.
- No. 433. Safety codes for the prevention of dust explosions.
- No. 436. Safety code for the use, care, and protection of abrasive wheels.

**Vocational and Workers' Education.**

- \*No. 159. Short-unit courses for wage earners, and a factory school experiment. [1915.]
- \*No. 162. Vocational education survey of Richmond, Va. [1915.]
- No. 199. Vocational education survey of Minneapolis, Minn. [1916.]
- No. 271. Adult working-class education in Great Britain and the United States. [1920.]

**Wages and Hours of Labor.**

- \*No. 146. Wages and regularity of employment and standardization of piece rates in the dress and waist industry of New York City. [1914.]
- \*No. 147. Wages and regularity of employment in the cloak, suit, and skirt industry. [1914.]
- No. 161. Wages and hours of labor in the clothing and cigar industries, 1911 to 1913.
- No. 163. Wages and hours of labor in the building and repairing of steam railroad cars, 1907 to 1913.
- \*No. 190. Wages and hours of labor in the cotton, woolen, and silk industries, 1907 to 1914.
- No. 204. Street railway employment in the United States. [1917.]
- No. 225. Wages and hours of labor in the lumber, millwork, and furniture industries, 1915.
- No. 265. Industrial survey in selected industries in the United States, 1919.
- No. 297. Wages and hours of labor in the petroleum industry, 1920.
- No. 356. Productivity costs in the common-brick industry. [1924.]
- No. 358. Wages and hours of labor in the automobile-tire industry, 1923.
- No. 360. Time and labor costs in manufacturing 100 pairs of shoes. [1924.]
- No. 365. Wages and hours of labor in the paper and pulp industry, 1923.
- No. 374. Wages and hours of labor in the boot and shoe industry, 1907 to 1924.
- No. 376. Wages and hours of labor in the hosiery and underwear industry, 1907 to 1924.
- No. 394. Wages and hours of labor in metalliferous mines, 1924.
- No. 407. Labor cost of production, and wages and hours of labor in the paper box-board industry. [1925.]
- No. 412. Wages, hours, and productivity in the pottery industry, 1925.
- No. 413. Wages and hours of labor in the lumber industry in the United States, 1925.
- No. 416. Hours and earnings in anthracite and bituminous coal mining, 1922 and 1924.
- No. 421. Wages and hours of labor in the slaughtering and meat-packing industry. 1925.
- No. 422. Wages and hours of labor in foundries and machine shops, 1925.
- No. 431. Union scale of wages and hours of labor, May 15, 1926.
- No. 434. Wages and hours of labor in the men's clothing industry, 1911 to 1926.
- No. 438. Wages and hours of labor in the motor vehicle industry, 1925. (In press.)
- No. 442. Wages and hours of labor in the iron and steel industry, 1907 to 1925.
- No. 443. Wages and hours of labor in woolen and worsted goods manufacturing, 1925. (In press.)
- No. 446. Wages and hours of labor in cotton-goods manufacturing, 1910 to 1926. (In press.)

**Welfare Work.**

- \*No. 123. Employers' welfare work. [1913.]
- No. 222. Welfare work in British munitions factories. [1917.]
- \*No. 250. Welfare work for employees in industrial establishments in the United States. [1919.]

**Wholesale Prices.**

- No. 284. Index numbers of wholesale prices in the United States and foreign countries. [1921.]
- No. 440. Wholesale prices, 1890 to 1926. (In press.)

**Women and Children in Industry.**

- No. 116. Hours, earnings, and duration of employment of wage-earning women in selected industries in the District of Columbia. [1913.]
- \*No. 117. Prohibition of night work of young persons. [1913.]
- \*No. 118. Ten-hour maximum working-day for women and young persons. [1913.]
- \*No. 119. Working hours of women in the pea canneries of Wisconsin. [1913.]
- \*No. 122. Employment of women in power laundries in Milwaukee. [1913.]
- No. 160. Hours, earnings, and conditions of labor of women in Indiana mercantile establishments and garment factories. [1914.]
- \*No. 167. Minimum-wage legislation in the United States and foreign countries. [1915.]
- \*No. 175. Summary of the report on conditions of woman and child wage earners in the United States. [1915.]
- \*No. 176. Effect of minimum-wage determinations in Oregon. [1915.]
- \*No. 180. The boot and shoe industry in Massachusetts as a vocation for women. [1915.]
- \*No. 182. Unemployment among women in department and other retail stores of Boston, Mass. [1916.]
- No. 193. Dressmaking as a trade for women in Massachusetts. [1916.]
- No. 215. Industrial experience of trade-school girls in Massachusetts. [1917.]
- \*No. 217. Effect of workmen's compensation laws in diminishing the necessity of industrial employment of women and children. [1918.]
- No. 223. Employment of women and juveniles in Great Britain during the war. [1917.]
- No. 253. Women in the lead industries. [1919.]

**Workmen's Insurance and Compensation (including laws relating thereto).**

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- \*No. 102. British national insurance act, 1911.
- \*No. 103. Sickness and accident insurance law of Switzerland. [1912.]
- No. 107. Law relating to insurance of salaried employees in Germany. [1913.]
- \*No. 155. Compensation for accidents to employees of the United States. [1914.]
- No. 212. Proceedings of the conference on social insurance called by the International Association of Industrial Accident Boards and Commissions, Washington, D. C., December 5-9, 1916.
- No. 243. Workmen's compensation legislation of the United States and foreign countries, 1917 and 1918.
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