

FILE NAME: Goodyear (GY)

DATE: 1968 Sept 10

DOC#: GY029

DOCUMENT DESCRIPTION: Inspection Report

September 10, 1968

Mr. Leo C. Chervenio, Manager
Corporate Safety Programs
The Goodyear Tire & Rubber Company
1144 East Market Street
Akron, Ohio 44316

Dear Mr. Chervenio:

The enclosed report relates to my visit with you at your Air Spring Curing Department 276B early in March of this year. You will note that it is principally a restatement of the description, demonstration, and understanding of the Delco curing units as they were explained both to me and to Messrs. Hemsley, Munford, and Wadsworth on that day, resulting in our mutual agreement that the operation is adequately safe. And although this completes the file in this particular case, the recommendation stated in paragraph 6 is something we, too, shall put to use by our staff wherever we can.

Thank you again for your courtesy extended to me during my visit. It was a pleasure to work with all those whom I contacted. If you have any further question about this or any other matter where we may be of help to you, please let us know.

Very truly yours,

Walter A. Schirmer
Walter A. Schirmer, P.E.
Safety Engineer

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0002-056A

September 10, 1968

Re: The Goodyear Tire & Rubber Company
1144 East Market Street
Akron, Ohio 44316

1. On May 1968, Walter Schirmer of this Division visited the above named company to investigate certain conditions in Department 276B of Plant No. 2. This was in response to a request for such service forwarded by Sam Oliverio, District Supervisor, also of this Division.
2. Personnel contacted were Messrs. L. C. Chervenik, Manager of Corporate Safety Programs; Robert Plokes, Safety Engineer; W. E. DeBruin, Attorney - Labor Relations; W. P. Culp, Manager Engineering Industrial Products; and K. W. Boehm, Senior Mechanical Engineer. Also contacted in Plant No. 2 were Messrs. T. Hensley, H. Munford, and W. Wadsworth, all representatives of United Rubber Workers Union.
3. The conditions to be investigated were related to machinery used to manufacture Delco type, rubber, air sleeves for automotive use. The sleeves are initially of green rubber built up to prescribed thickness and length on special tubes or mandrels of steel. The mandrels all had been machined externally to impart desired configurations to the rubber sleeves as they are processed in one of several diaphragm type curing units. The curing units are each shaped like a horizontal cylinder, having in the near end wall a number of circular openings of a size to receive the built up mandrels. Each circular opening is interconnected to a cylindrical diaphragm or bladder of rubber that surrounds the green rubber on the mandrel. During the curing process, steam at 125 psi gage pressure and about 350°F. temperature is valved into the unit, and compresses each bladder uniformly around the green rubber and mandrel within it. After the curing cycle is ended, the steam valve is closed and drain valves and an air valve are opened to scavenge the remaining steam and hot condensate out the drains, using 100 psi air pressure. In the next step, with drain valves open and air valve closed, a cold water valve is opened for cooling the cured sleeves and mandrels.

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At the end of the cooling cycle, a vacuum valve is opened and all other valves are closed to produce low pressure in the unit, thus expanding the bladders and freeing their grip on the mandrels. The mandrels with the cured sleeves are then unloaded and the curing unit is made ready for the next load.

If not all the curing cavities in a unit are filled with a mandrel, the pressure of the steam during the curing cycle will rupture any empty bladder, and steam would blow out of the opening into the operator's working zone. Also, such rupturing can happen when a bladder becomes defective after such use. It was the result of such an occurrence on January 8, 1968, that prompted a complaint by the operators through their union representatives. However, at the time of the visit and since about January 24, 1968, the entire series of 8 steps in the operation of each of the Delco curing units was operating under a very complex, but nevertheless a very simply operated control system that is partly manual but mostly automatic, and that has many safeguards built into it. The operation of each unit is controlled by 3 push buttons labeled "Load", "Start", and "Cool", also by 4 colored lights associated with the push buttons, and by a toggle switch for cutting off steam pressure during the curing steps only. One of the main safeguards is an aluminum steam shield that completely covers the loading end of each unit. The upper three-fourths of the shield has a cylindrically shaped flange for deflecting along the sides of the unit any steam that might escape, as when a bladder ruptures. The lower fourth of the shield is shaped like a depending trough to carry such steam's condensate down to the floor drain beneath the unit. Also, and most important of all, the shield is so designed that, when it is properly positioned and held in place, it energizes 4 micro switches that are wired in series to the timer "Start" button. Thus, unless the shield is in place, the cure cycle can not be started.

5. Beginning with all lights out on the control panel, the operator starts Step 1 by pressing the "Load" button which controls valves to produce a vacuum inside the unit, and thus operates a pressure switch to turn on a green light, indicating the unit is ready for loading as long as the light is on. Step 2 through Step 6 starts when the operator pushes the "Start" button which energizes the timer (turning on a red light) then turns on the steam together with a pressure operated red cure light, and continues to control Steps 3 through 6 as follows: Step 3, Main Steam Cure, 11 minutes; Step 4, Air Scavenging, 18 seconds; Step 5, Water Cooling, 30 seconds; Step 6, Unloading, indefinite time, with the green loading-and-unloading light on. When unit is unloaded the operator pushes the "Cool" button, which starts

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Steps 7 and 8, turns on a blue light, resets the valves turning off the green light, and resets the timer for the next sequence. After 1 minute, all lights are out and the unit is ready for the next loading.

6. It is the considered opinion of the investigator that the above described control means with its many other safeguards, including gauges, limit switches, relief valves, recording instruments, and the like, provides a much safer workplace than before. It is recommended that the safety principles of the steam shield be used and designed into the operation of any machine using compressible fluid, wherein sudden escape of the fluid may result in injury to the operator or anyone near the machine.
7. It was understood that prior to the time of the visit the union representatives, Messrs. Hensley, Munford, and Wadsworth, did not have a full understanding of the above described control means. A full description and demonstration of the equipment was given to them, as well as to the investigator, by qualified company personnel. When they understood how the control means was operated and what safeguards were provided by it, they agreed that the former hazards had been eliminated and the workplace was much safer.

Respectfully submitted,

Walter A. Schirmer

Walter A. Schirmer, P.E.
Safety Engineer

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