FILE NAME: Goodyear (GY)

DATE: 1968 Jan 24

DOC#: GY028

DOCUMENT DESCRIPTION: Unpublished Report - The Sequence & Operation of the 1965-1968 Model Diaphragm Curing Unit

February 6, 1968
Revised Jan. 24, 1968

THE SEQUENCE AND OPERATION OF THE 1965-1968 MODEL DIAPHRAGM CURING UNIT (FOR DELCO TYPE AIR SLEEVES)

RW 29787, DEPT 276-A, BUDGET AE-9-65-182 IP

Control

1 - No 420 BJ 10021 Taylor Rewired "Digital Set Programmer" using Goodyear services of 110 volt, 60 cycle electrical service and 100 lb air to control 10 pneumatic and 2 electrical functions. This control in its panel will control 12 Taylor piston-operated valves. See Dwg IP-140022-21 for Schematic Piping and Electrical Diagrams (1 copy in Development Dept 212-B, 1 copy in Maintenance Dept 214-B, 2 copies in Engineering Dept 214-A, 1 copy to Instrument Lab 110-X).

Panel

Taylor Control Panel Sk 59507 (but rewired by Goodyear) containing above control, Rogers pressure switch, selector valves, solenoid valve, 2 blow-down timers, filter-regulator-gage, all piping and wiring internally by Taylor. On the exterior of the panel will be 3 push buttons (load, start, cool) and 4 lights (vacuum - green, start - red, cool - blue, timer energized - red). Added to the panel by Goodyear Engineering is a toggle switch to cut off the steam pressure during Steps No 1 and 2 only.

Valves

Taylor Piston Operated, 5 - Normally Open and 7 - Normally Closed Type. Each valve has a red indicator below its cap to indicate when control air has depressed the piston. Each cure unit will have 10 manual valves furnished by Dept 214-B to cut cure units off from control for bladder changes, etc.

Piping

All piping by Dept 214-B per Dwg IP 140022-21 and Dwg IP-130022-11 Dept 214-B to furnish 1/4" copper tubing and fittings for control air piping.

38

Electrical

Dept 214-B to furnish 110 V - 60 Cycle service to panel. See Dwg IP-140022-21.

The Curing Operation

Loading

Step 1 Push the "Load" button on panel. (Loading)

Solenoid Valve SV-1 = Energized and instrument air by-passes Taylor Timer to valves below.

Green light is on.

manual open.

NO CV-1 Valve = Closes

NO Condensate Valve 1 = Closes

NO Drain Valve 1 = Closes

NC Vacuum Valve 1 = Opens

This operation does not energize the timer, only the solenoid valve (SV-1) inside the panel is energized. This operation can only be safely canceled by manually tripping out the manual overrido on the valve located in the panel (marked SV-1). To attempt to reset the timer through the use of the jog button inside the timer with instrument air on and without the unit being loaded may well permit the cure bladders to be blown out by live steam and seriously endanger personnel in area.

Curing

The timer remains in the "Load" position indefinitely unless canceled as explained above or until the curing cycle starts. The Cure Cycle can only be started after the aluminum steam shield is in place energizing the 4 micro switches wired in series to the timer "Start" button and toggle switch located on panel must be in "On" position. The 4 micro switches are located - one on each side of each heater. There is no further safety when the steam shield is in place and if the "Start" button is pushed without all the curing cavities loaded correctly, curing bladders will be ruptured, unless toggle switch is turned "Off" quickly.

39

Step 2 When the cure unit is completely loaded and the steam shield locked in place, push the "Start" button. The timer is now energized, and solenoid valve SV-1 is shifted - closing NC Vacuum Valve-1, opening NO Valve CV-1, NO Condensate Valve-1, and NO Drain Valve-1. At this same instant, the first step of the timer is timing out and the valves are in the following position:

Step 1 = 1/2 Min (Preliminary Cure)

Red Timer Light Comes On

Red Cure Light Comes On - Thru PS

Instrument Air Off NO Drain Valve 1 = Open

Instrument Air Off NO Drain Valve 2 = Open

Instrument Air Off NO CV-1 Valve = Open

Instrument Air on NO Steam Valve = Open

Instrument Air Off NO Condensate Valve 1 = Open

Instrument Air Off NO Condensate Valve 2 = Open

All other valves are closed and 125 psi lb steam is going through the curing units and the mandrel-internal heaters to drain.

When the first step of the curing cycle ends the second step is entered and begins to time out.

Step 3 Step 2 = 11 Min (Main Cure)

The valves are in the following position:

Instrument Air On NO Drain Valve 1 = Closes

Instrument Air On NO Drain Valve 2 = Closes

Instrument Air On NO Condensate Valve 1 and

NO Condensate Valve 2 = Operate through Blow-Down Timers 1 & 2
(Actually air closes thru blow downs which periodically open cond. valves.)
Valve alternates 6 seconds open and 54 seconds closed with 1/2" orficed Condensate Valves and alternates 20 seconds open and 40 seconds closed with 5/16" orficed Condensate Valves.

4C

Instrument Air On NC Steam Valve = Remains Open

Instrument Air Off NO CV-1 Valve = Remains Open

All other valves remain closed during this curing step.

Step 4 Step 4 = 18 seconds (Scavenging)

When the above step times out, the third step is entered and the valves are shifted into the following position:

Instrument Air Off NC Steam Valve = Closes

Instrument Air Off NO Drain Valve 1 = Open

Instrument Air Off NO Drain Valve 2 = Opens

Instrument Air On NC Air Valve = Opens 100 psi

Instrument Air Off NO CV-1 Valve = Remains Open

All other valves remain closed during this step while steam and condensate are blown by air to drains.

Step 5 Step 5 = 30 seconds (Cooling)

When the above step times out, the fourth step is entered and the valves are in the following position:

Instrument Air On NC Water Valve 2 = Opens (Operates CV-1)

Instrument Air Off NO Drain Valve 2 = Remains Open

Instrument Air On NO CV-1 Valve = Closes

Instrument Air Off NC Air Valve = Closes

All other valves remain in their normal open or closed position while the mandrel internal heaters are being cooled.

Step 6 Step 6 = Indefinite time (Unloading)

When the above step times out, the fifth step is entered and the valves are in the following position:

Micro Switch A Closed (3) - (5)

Instrument Air On NO CV-1 Valve = Remains Closed Operates from Vac-1

Instrument Air On NO Drain Valve 1 = Closes Operates from Vac-1

Instrument Air On NO Condensate Valve 1 = Closes Operates from Vac-1

Instrument Air On NC Vacuum Valve 1 = Opens

Red Timer Light ~~Does Not~~ REMAINS ON

The Green Light Comes On - Operates from PS

All other valves are in their normal open or closed position. This step has also opened MS-1 micro switch in the timer and interrupts the timer circuit. The timer will not time out until the "Cool" button is pushed. At this point, the cure unit should be unloaded.

Step 6 = 30 seconds

Cool (Timer Reenergizing)

Step 7 Push the "Cool" button and the timer is again energized with valves in the following position:

Red Timer Light Comes On

Micro-Switch #2 is Energized

Instrument Air Off NC Vacuum Valve 1 = Closes

Instrument Air Off NO Drain Valve 2 = Remains Open

Instrument Air Off NO Drain Valve 1 = Opens

Instrument Air On NC Water Valve 1 = Opens and operates Vent Valve

Green Light Goes Out - By PS, ATMOSPHERIC PRESSURE REGISTERED INSIDE UNIT

Blue Light Is On - Energized by Micro-Switch #2

Step 8 Step 7 Vac 2 = 1/2 min (Timer Resetting for Next Cycle)

When this step times out, the timer resets and all valves return to normal open or closed position, and all lights are out.

Instrument Air On NC Vacuum Valve 2 = Open

Responsibilities

The timing of each step in the curing and the cooling program will be the responsibility of the Development Dept 202-B. The operation of the valving will be the responsibility of the Engineering Depts 214-A & B. The correction of, or the changing of the pneumatic or the electrical functions of the programmer will be the sole responsibility of Engineering Dept 214-A. No pneumatic or electrical changes are to be made without notifying the Engineering Dept 214-A, and will be made only under the direct supervision of the Dept 214-A Mechanical Engineer.

K W Boehm
Dept 214-A

KWB:sds

cc: Dept 276-A (5)
Dept 202-B (3)
Dept 110-F Lab (2)
Dept 214-B (3)
Dept 214-A (2)
Bento Master in Engr Dept 214-A File