

## Steam Z Case Study

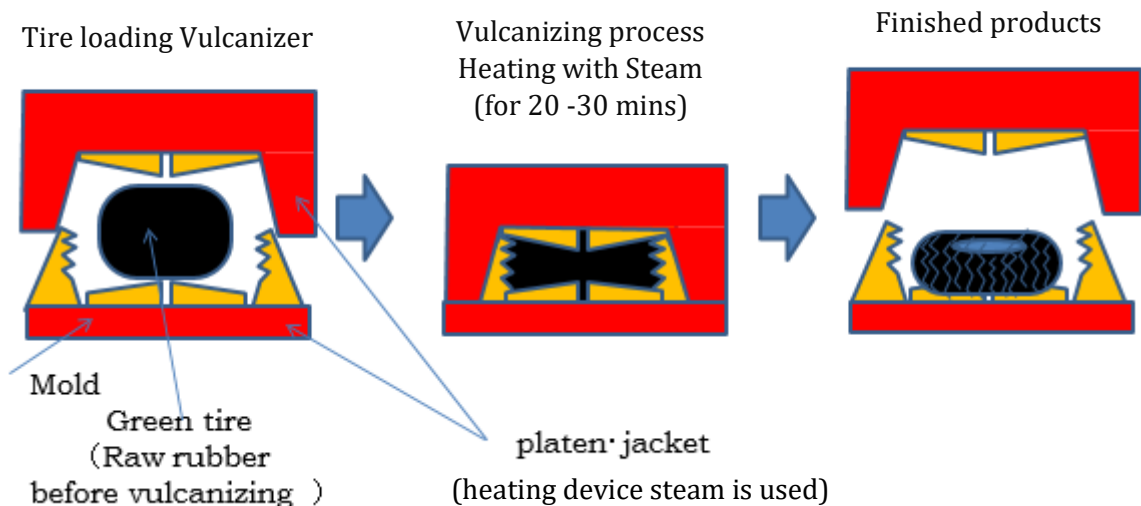


### Steam Loss solving in Vulcanization for Tire industry

by Continuous Condensate drain Steam Z

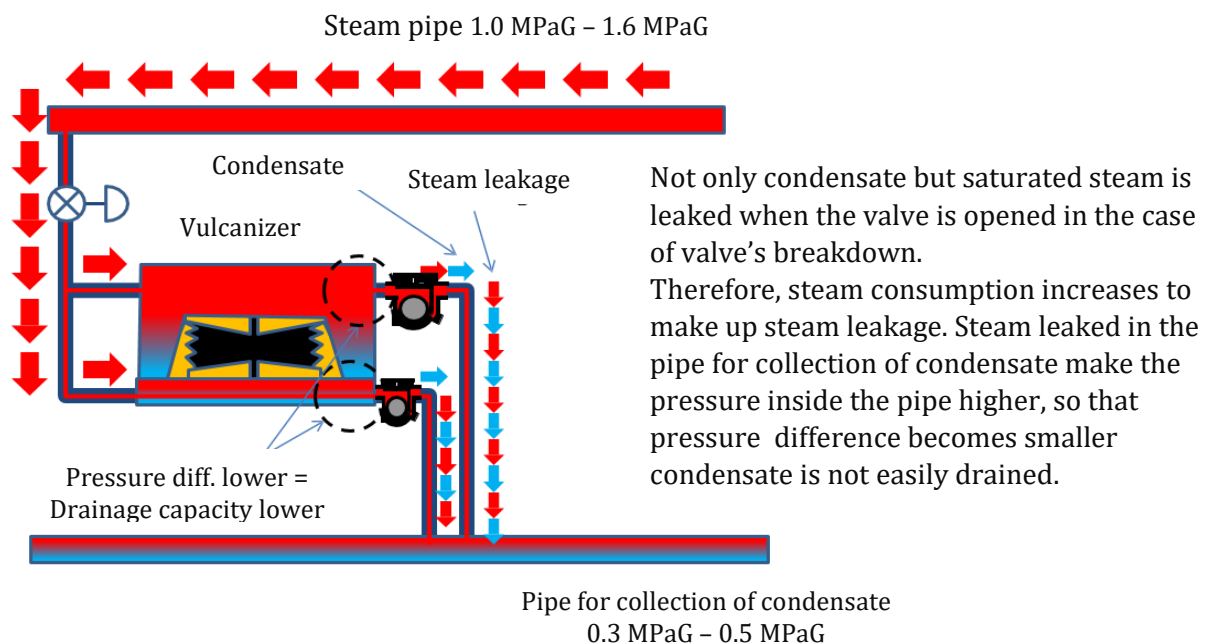
- Overall Process of Vulcanizing**

Metal disk was heated with steam on both sides of the raw rubber to indirectly heated mold.



#### Before : Status for Conventional Steam Trap

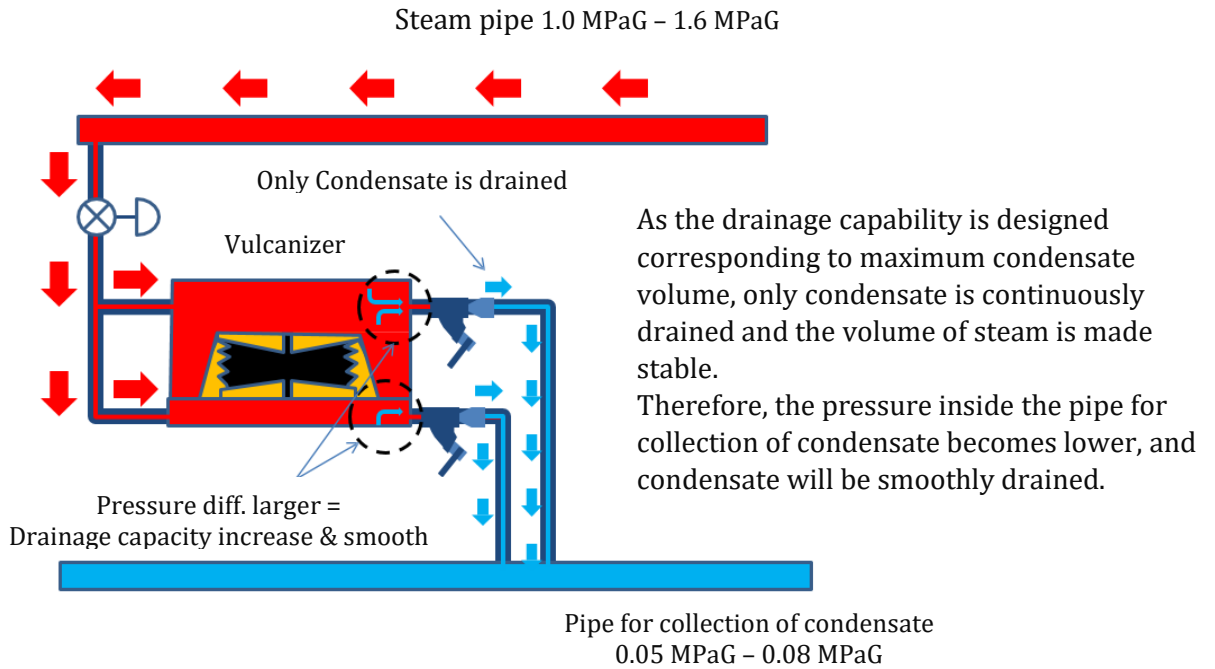
Steam Loss by the Conventional Steam Trap with movable valve !!!



The volume of steam increase due to steam leakage.

## After replacing with Steam · Z

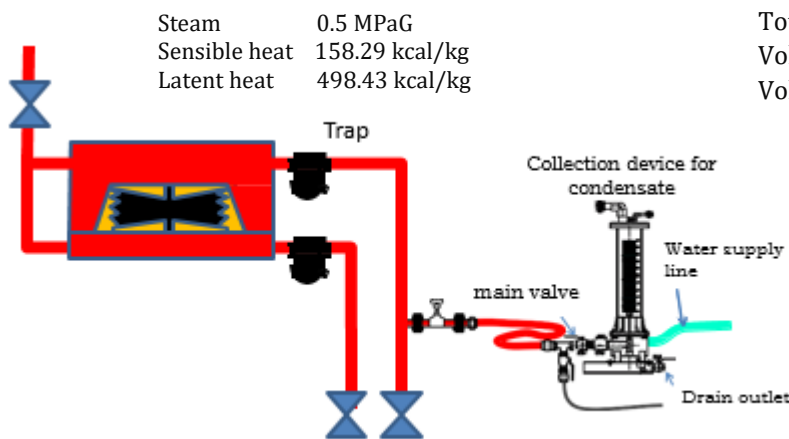
- Saving steam consumption of Vulcanizer**



As the drainage capability is designed corresponding to maximum condensate volume, only condensate is continuously drained and the volume of steam is made stable. Therefore, the pressure inside the pipe for collection of condensate becomes lower, and condensate will be smoothly drained.

**Calculate the amount of steam leakage by analyzing the weight, calories of condensate which is drained from conventional steam trap with movable valve.**

Time (min)	0	1	2	3	4	5	6	Result
Condensate (kg)	10	10.5	11.0	11.3	11.9	12.3	12.6	2.6 kg/6 min
Temperature (°C)	12	24	35	44	58	67	78	66 °F (ΔT)



Steam 0.5 MPaG  
Sensible heat 158.29 kcal/kg  
Latent heat 498.43 kcal/kg

Total heat : 331.8 kcal/kg  
Volume of condensate : 2.6 kg/6min (26 kg/h)  
Volume of steam leakage : 0.34 kg/6min (3.4 kg/h)

↕  
**Potential Energy Cost savings  
= 3.4 kg/hr-steam**

The above-mentioned collection test was carried out on a 5% of Vulcanizer randomly extracted from the factory. We estimate the total amount of steam leakage throughout the whole factory from the average value.

Sample) Total 200 sets × 5% = 10 sets

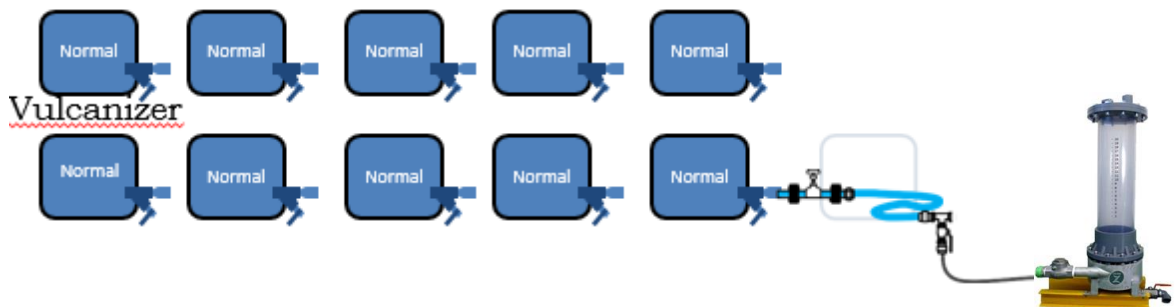
Average amount of steam leakage : (2 + 8 + 3 + 12 + 10 + 4 + 2) / 10 sets = 4.1 kg/h

**Total amount of steam leakage of whole factory = 800 kg/h**



By installing an Orifice type trap in the Vulcanizer which conducted the collection test and performing collection test again, it is confirmed whether the steam leakage is actually reduced. If it is reduced, the value is taken as the Energy Saving potential.

Energy reduction potential when adopting the whole plant  
= 800 kg/h (4.1 x 200 sets)



- **Potential research for CO<sub>2</sub> reduction in terms of global warming protection**

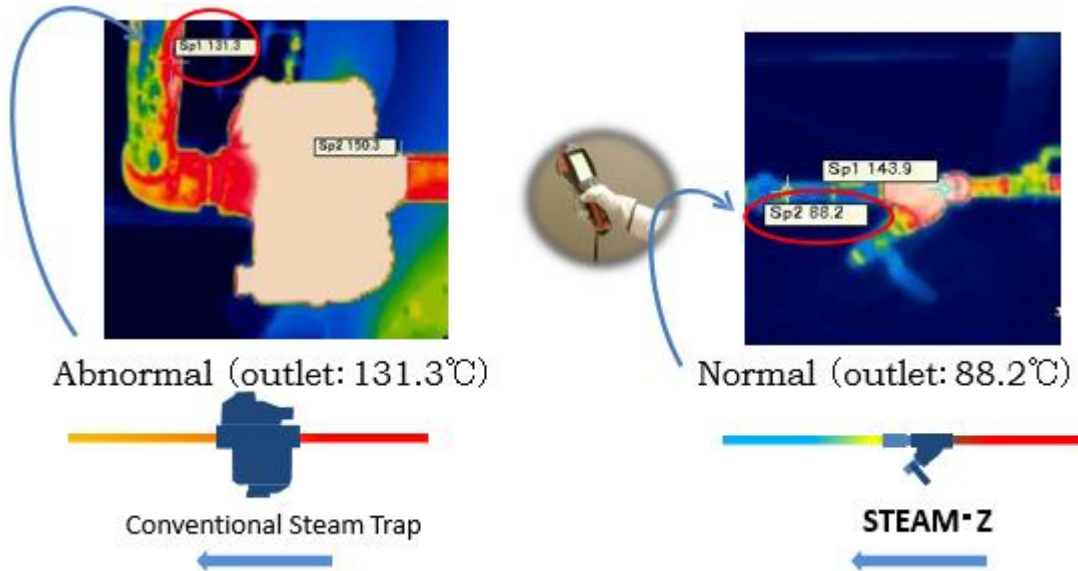


Potential Steam Saving : 800 kg/h = 6,400 ton/year  
(Operation of 8,000 hrs/year)  
Potential CO<sub>2</sub> Reduction = 1,076.9 ton CO<sub>2</sub>/year

【calculation method※】 Saved volume of steam (6,400 t/y) x 2.8 GJ/t x 0.0601 t/GJ-CO<sub>2</sub>  
Industrial Steam 1,000 kg = 168 kg-CO<sub>2</sub>

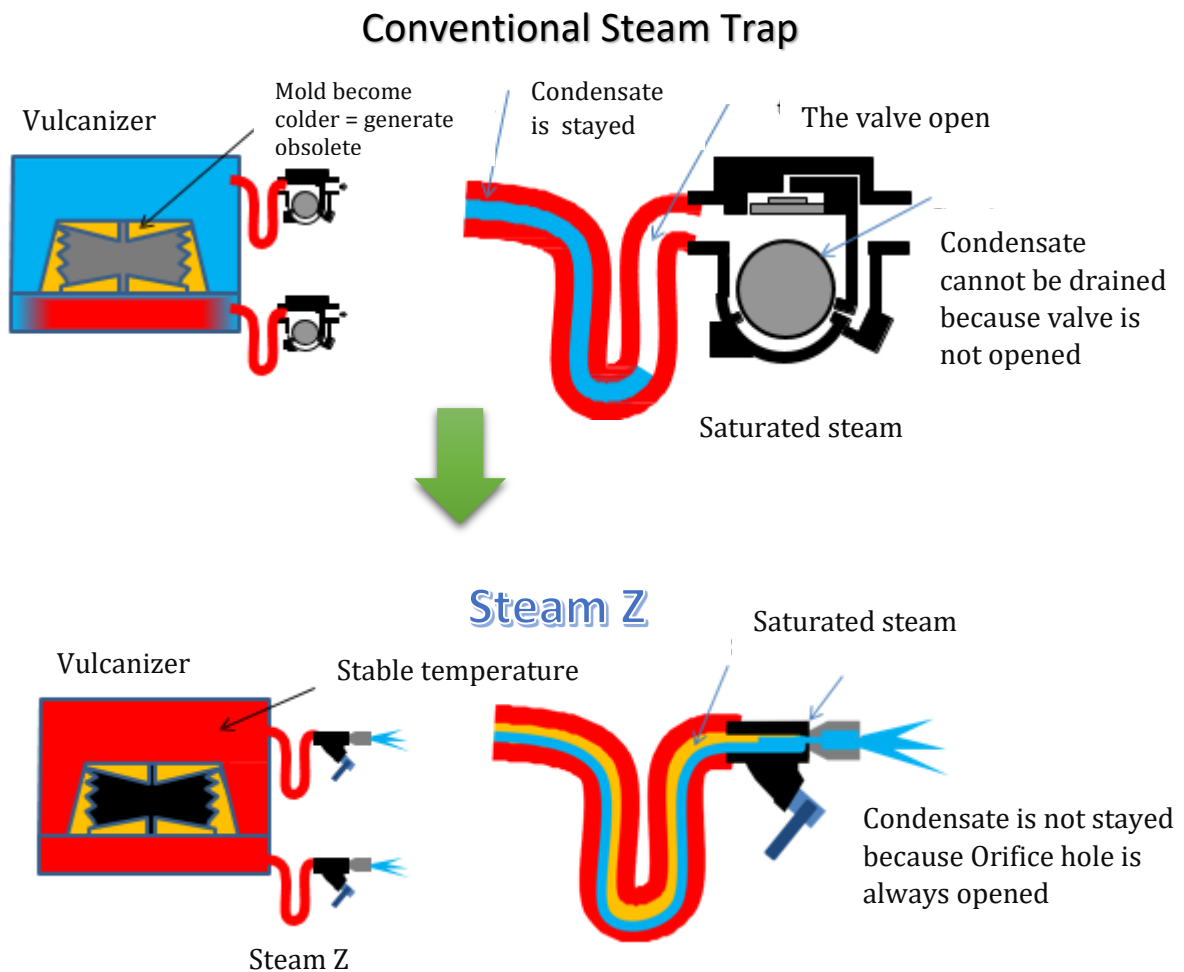
- **Conservation labor relief**

In the case of the **Steam Z** Orifice type trap, no steam leakage due to the degrading of aging may occur, such as to change the condensate load factor if the model selection mistakes and operating conditions have been changed, you may steam leakage occurs. By shooting the temperature distribution of the pipe surface in thermography, advance to prevent trouble by performing maintenance to understand the operational status, you will contribute to conservation labor relief.



- **Quality stabilization**

In the control is running valve Steam trap and solenoid valve, hitch is temporarily draining by the timing of the opening and closing operation of the valve, it may reduce the temperature of the mold. Because there is orifice-type trap for discharging the constantly drain. The temperature maintained of the primary side is constant, the product quality is stable.



**Best Solution to Fuel Cost Saving and Reduction of CO<sub>2</sub>**

**STEAM-Z**

**Steam consumption reduction → Fuel reduction → CO<sub>2</sub> reduction**