

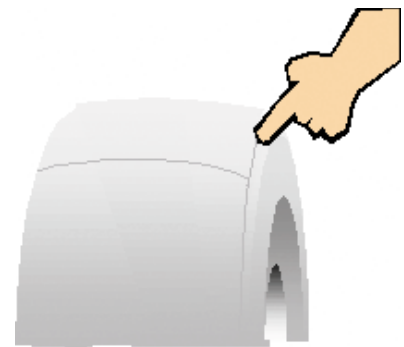
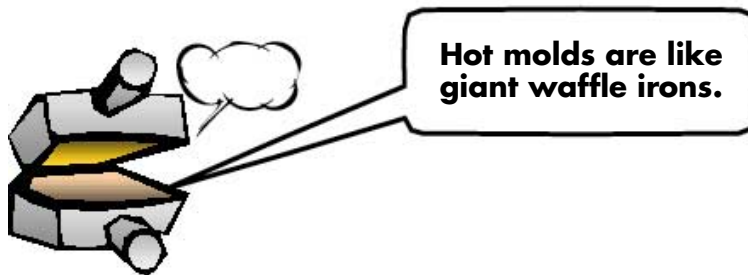
# TOYO TIRE TALK

## Subject: Tire Pattern Series - Tire Mold

When you have a chance to look at a tire, you may find some thin lines of rubber film on the tread area.

Some tires have several lines crossing the whole tread in parallel , and others a single line running circumferentially located near the center of the tread.

As you already know, these are the small flashes of rubber coming from the joint of the tire mold segments.



The tire mold types can be roughly categorized into two systems:

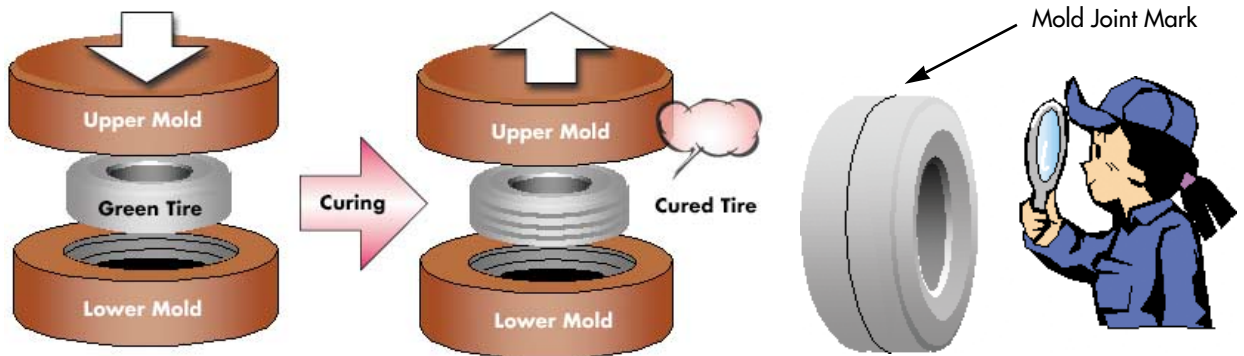
- 1) Shell Mold (Two piece mold, comprising an upper and a lower mold.)
- 2) Segmental Mold ( Several tread pattern sectors and two side plates.)

In this chapter, we will introduce the tire mold types, for your information.

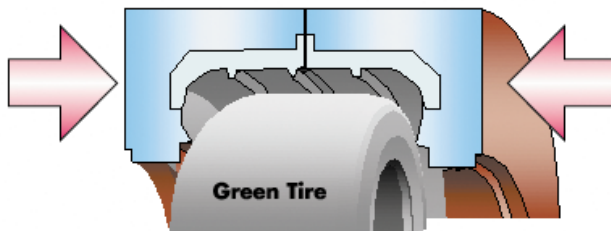
# TOYO TIRE TALK

## 1. Shell Mold

Two piece mold comprised of an upper and a lower mold



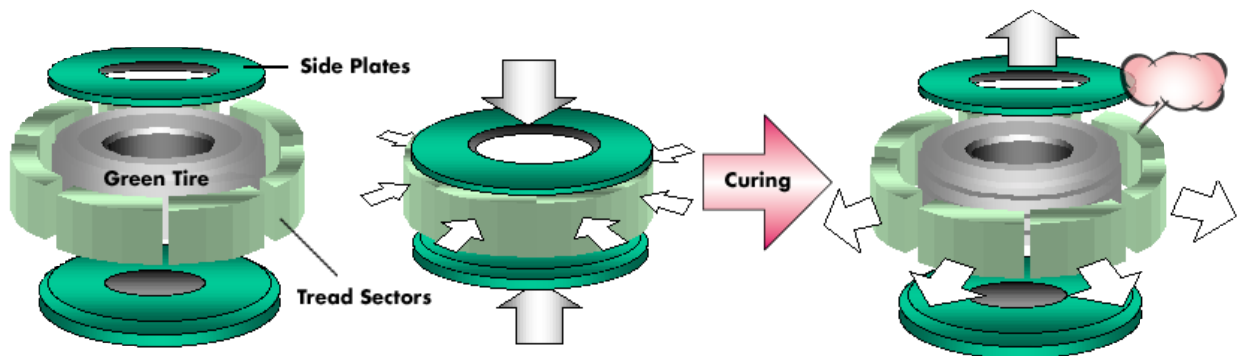
## Cross Section of the Shell Mold



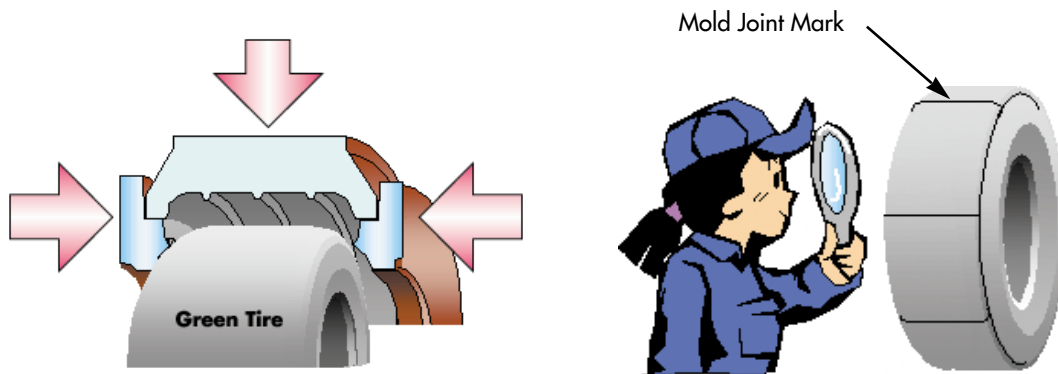
# TOYO TIRE TALK

## 2. Segmental Mold

Several tread pattern sectors and two side plates

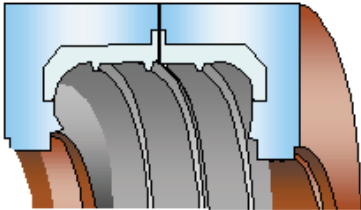
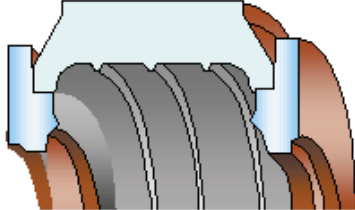


### Cross Section of the Segmental Mold



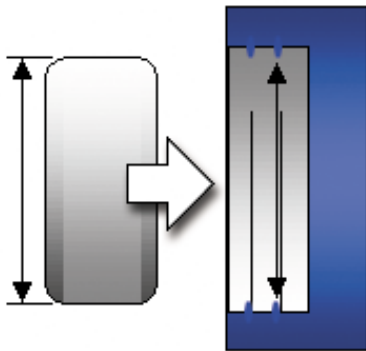
# TOYO TIRE TALK

## Characteristics of each Mold Types

Type of Mold	 <p><b>1. Shell Mold</b></p>	 <p><b>2. Segmental Mold</b></p>
Partition	One Upper and one Lower Mold	2 Side Plates + *several Tread Sectors *PCR : from 7 to 11 sectors *TBR : from 9 to 10 sectors
Mold Cost	Lower Cost	Higher Cost
Production Time	Shorter Period	Longer Period
Advantages	1) Easier Maintenance	1) Less opportunity of tread rubber cracking when the tire is extracted from the mold. 2) More flexibility in the tread pattern design enabling deeper grooves /sipes than the Shell Mold. ◆ Less movement in the tread of the green tire [TBR] (Detailed information is on the next page.)
<p><b>The Mold Circularity Factor for Tire Uniformity :</b>            Nowadays, the accuracy of mold production has made rapid progress, and the circularity of both mold types shown above is no longer a critical factor for tire uniformity.</p>		

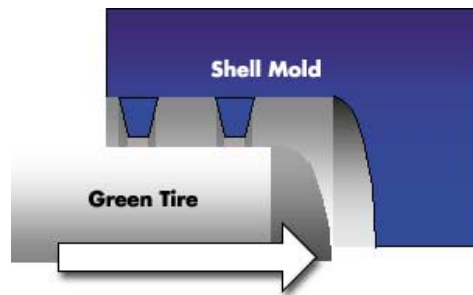
# TOYO TIRE TALK

## Less Movement in the Tread of the Green Tire

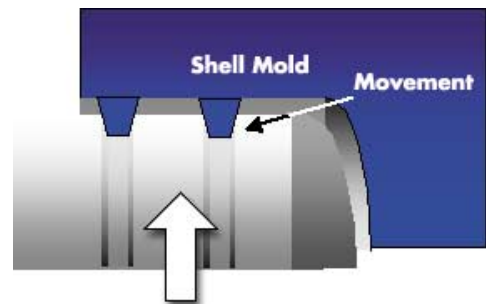


1) Theoretically, for the purpose of inserting a green tire correctly into a **Shell Mold**, the internal diameter of the Mold must be equal to or larger than the tire.

2) When the green tire is pressed by the bladder pressure, the tire is automatically pushed to the engraved Mold pattern.



The rubber, specifically the tread area, has to be deformed and shaped into the Mold contour. This process creates some movement of the tread rubber which may influence the conformity of thickness through the tread.



3) For all practical purposes:

After our careful and continued study about this Mold factor, we found that this theory does not necessarily apply to Passenger Car Tires. The results of the study show no difference between the Shell Mold and Segmental Mold with the shallower tread depth of Passenger Car Tires.

However, for Truck & Bus Tires with their deeper tread depth, the Segmental Mold features provide improved tire performance. The increased use of Segmental Molds for Truck & Bus Tires has resulted from the market demand for longer tire life, and has been spurred on by the Deep Tread Tire competition.

We will actively apply the Segmental Mold for these deeper TBR Tire Developments.