

Drawing #1 is from a tire loaded to its maximum capacity and corresponding maximum pressure molded on the sidewall. You can see from the rounded sidewall, the load is evenly distributed over the tread contact patch.

Drawing #2 illustrates the sidewall distortion that occurs when a tire is eight to ten PSI underinflated. The effects can be exaggerated with higher loads and/or lower inflation pressure. The inversion of the tread contact area is somewhat exaggerated for the purpose of illustration, but reflects the results of contact pressure measurements taken across the tread of an underinflated tire. The actual buckling of the tread pattern results in fatigue cracking.

The buckling of the sidewalls cause exterior cracking, and more seriously, the continuous flexing and inversion of the plies can crack the inner most ply and innerliner then migrate outward. The important factor to remember is the repeated compression and relaxation or flex cycles of the upper sidewall generate heat at highway speeds and will rapidly damage the tire. Sudden failure may then occur.

