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## Mechanism Analysis and Improvement Measures of Sidewall Bulge of All-steel Radial Tire for Engineering and Mining

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**Abstract:** The mechanism of sidewall bulge of all-steel radial tire for engineering and mining (referred to as engineering and mining tire) was analyzed, and the improvement measures were proposed. One of the main reasons for the sidewall bulge was that the angle of the pattern groove wall was too small, so the mold for pattern grooves jammed the carcass during tire curing, resulting in uneven distribution of compounds at the pattern groove and pattern block positions, and consequently causing different shapes of the carcass contour at the pattern groove and pattern block positions. Secondly, the carcass cord locking in the gaps between the sector blocks of the seam sector block forming drum was inconsistent during the tire forming, resulting in different carcass cord lengths between two bead rings at corresponding positions. Finally, the shapes and sizes of the shoulder pad and bead filler compound were not designed properly. Specifically, the curvature radius of the shoulder carcass contour was large, the curvature radius of the bead carcass contour was small, and the shoulder deformation was large when the tire was inflated, which aggravated the difference between the pattern groove and the pattern block positions. The improvement measures were as follows: increase the angle of the pattern groove wall in product design to reduce the unnecessary press of the mold pattern groove on the compound, use seamless sector block forming drums to ensure the consistency of the carcass cord lengths, optimize the shape and size of shoulder pad and bead filler compound, reduce the curvature radius of shoulder carcass contour, and increase the curvature radius of bead carcass contour. The improvement measures were confirmed to be effective by the successful application of two kinds of engineering and mining tires.

**Key words:** all-steel radial tire for engineering and mining; sidewall bulge; carcass contour; mechanism analysis; improvement measure

### 轮胎调压系统、轮胎及车辆

由浙江极氪智能科技有限公司和浙江吉利控股集团有限公司申请的专利(公布号 CN 115674959A, 公布日期 2023-02-03)“轮胎调压系统、轮胎及车辆”,涉及一种轮胎调压系统、轮胎及车辆。本发明轮胎调压系统包括移动终端、云端服务器以及胎压调整装置。移动终端获取到车辆待行驶路段路面材质的第1信息,并将其发送至

云端服务器,云端服务器基于第1信息确定轮胎的目标气压,并将目标气压发送至胎压调整装置,胎压调整装置将轮胎的气压调整为目标气压,即胎压调整装置根据移动终端获得车辆待行驶路段的路面材质信息,根据路面材质情况适应性地调整轮胎气压,使轮胎气压与待行驶路面材质有效匹配,进而增强车辆行驶的稳定性。

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