

# FRONT RUNNING GEAR DEVELOPMENT FOR THE AIRRARI PNEUMOBILE RACING CAR

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## Abstract

The University of Szeged Faculty of Engineering has taken part the International Pneumobile Competition since 2009. The pneumobiles are compressed air powered racing cars which are designed and manufactured by students.

Our race teams achieved a lot of great successes, meanwhile we gained a lot of experience. In every year 2-4 racing cars participated from Szeged at the competition in Eger as well as at the gala races organised in Kecskemét and Budapest. So far 10 cars have been made in Szeged and each car had a lot of modifications.

Last year one of the main fields of our development was the front running gear. Until 2015 we use rigid running gears but the increasing speed made necessary to design a sprung one. The higher and higher cornering speed needs better running gears. On the inner side of a three wheeled vehicle the wheel could lift up from the ground in a corner and the car drift out. A well-optimized sprung running gear is one of the most important components of a successful racing car. It results higher stability and cornering speed.

Our requirements against the new front running gear and steering system are the following: negative wheel camber angle as on the previous cars, to reduce the axial load of the front wheel on the outer side of the corner. Spring stroke is 20 mm out and 40 mm in, the change of the track must be minimal in this range, the turning circle diameter must be less than 6 meters, the actions of the springs are independent, during the actions of the springs the toe-out of the wheels must be constant.

We use our own-designed rack and pinion steering gear represented in this article. It has new modifications. The gear rack has adjustable guide bearing, so the backlash of the 2016 version is greatly reduced.

The new running gear is designed with Autodesk Inventor. The correct working check and final modifications were done with Lotus Shark Suspension Analysis software.

*Key words: pneumobile, running gear, steering gear, Lotus Shark Suspension Analysis*

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