GAUGE FOR THE CONTINUOUS MONITORING OF TIRE PRESSURE

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I hope to make a full report soon on my investigations into the pressure-monitoring method for improved efficiency and accuracy in course measurement. However, last Friday I tested a pressure gauge I devised for the continuous monitoring of tire pressure during the certification of “Run for Life” in Raleigh, NC, and results were so good that I feel measurers should learn about it without delay.

The gauge can be assembled quickly from currently available parts for about $12, It is screwed onto a Presta stem just enough to register tire pressure and can remain in place for instant readout during bicycle rides as shown in the photo. (A rim with Schraeder hole can be converted to a Presta hole with an adapter costing only a few cents.) The gauge is so light that it has no detectable effect on the handling of even high-performance rims.

For simplicity I decided that I would not adjust pressure during course measurement unless pressure readings indicated it would be necessary to avoid a short course. In fact adjustment was not necessary despite the fact that a thunderstorm occurred in the middle of measurements that dropped the temperature by 15 deg C within a few minutes.

Performance of the gauge was flawless throughout measurements. Results are summarized below with notes. Postcalibration was done only for purposes of validation of the method, since course overall measurement was done at a higher pressure than that in precalibration.

Ride	Time	Temp C	Press kPa	Ave kPa	Rev
Precalibration, 400 m	10:30-10:45	30	783-783	783	190.73
Fixed finish to preliminary start line by calc rev.	11:43-12:18	40-41	800-800	800	2386.51
Preliminary start to finish.	12:18-1:06	41-35	800-788	794	2386.45
Mile splits from start.	2:23-3:07	30-38	767-780	773.5	768.14 (each)
Postcalibration, 400 m.	4:25- 4:35	39-38	792-790	791	190.67

1. Calibration constant = 477.30 rev/km.

2. The primary calibration for the gauge is kPa (0.145 psi). The ride was started with a tire pressure of 800 kPa or 17 above that for the calibration. Since I knew from previous tests that the calibration constant for this tire changes at the rate of 0.0015 %/kPa, I anticipated a 0.025%-long course.

3. During this ride a thunderstorm was rapidly moving in and temperature was dropping rapidly. Average tire pressure during this ride was 6 kPa less than in the first ride so it should have produced a shorter course. In fact it gave 0.06 rev longer. Evidently the effect of lower tire pressure was more than offset by the more accurate ride through greater course familiarity. The start was extended by 0.06 rev.

4. This ride was delayed for over one hour because of heavy rain. At the start, tire pressure was down to 767 kPa or 16 below calibration pressure, so I anticipated short splits. However I judged the starting pressure satisfactory in view of the fact that the splits were not to be certified, and, since temperature was rapidly rising after the storm, pressure was bound to increase as proved to be the case.

5. Temperature and tire pressure continued to increase so that at postcalibration it was 8 kPa higher than at precalibration. Consequently, the calibration constant was slightly lower.