Tyre Gauge Survey

A Survey of Service Station and New Pressure Gauges

Conducted by RACQ Technical Services
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Tyre Pressure Gauge Survey

Introduction.

Incorrect tyre inflation pressure is a well-documented cause of catastrophic tyre failure, rapid and uneven tyre wear and increased fuel consumption. It can also affect ride and handling.

During December of 2005 the RACQ Technical Services department conducted a survey of the tyre inflation equipment available to the motoring public in 59 service stations in the Brisbane Metro area.

Sites were selected at random in Brisbane's northern, eastern, western and southern suburbs.

The purpose of this survey was to determine the typical accuracy of publicly available tyre inflation equipment, and its accessibility and safety for the user.

A second survey looked at the accuracy of a number of tyre gauges that are commonly available to motorists through recognised auto parts and accessories suppliers and retail outlets.

Methodology

Two tyres were inflated at publicly available air pumps at randomly selected service station driveways throughout Brisbane. One was a normal road wheel inflated to 30psi (206.7KPa), the other was a space saver type spare wheel that was inflated to 60psi (413.4KPa). The lower figure was chosen because it represented a typical inflation pressure for a wide range of vehicles, while the higher pressure was considered to be the highest pressure that was likely to be required for a typical passenger vehicle.

After inflation, the tyre pressures were checked with a professional quality tyre pressure gauge that had been tested for accuracy against a test facility master calibration gauge.

The actual inflation pressure for each tyre was then recorded and the variation (in pressure units and percentage terms) from the indicated pressure calculated.

The master unit was re-calibrated after the survey was completed, with insignificant change apparent to the pre-test calibration check.

The type of inflation device and its apparent condition was recorded. The hose condition was visually assessed for condition and adequacy of length.

An assessment of the equipment's accessibility and any potential safety issues, such as exposure of the user to passing vehicle traffic etc, was made.

An assessment of whether there was likely to be sufficient light to use the equipment at night was made.

The second phase of the survey involved the purchase of 7 tyre gauges of different styles and prices from various popular suppliers.

The brand and model, purchase price and type of equipment were recorded. The units were also assessed for suitable instructions, apparent quality of manufacture and finish and functionality.

These were then tested against a professional quality tyre gauge that had been tested for accuracy against a test facility master calibration gauge. Test pressures were 30 and 60 psi.

The actual readings were recorded and the variations calculated.

The sample was kept relatively small with no attempt made to test the sizable range of brands and models available.

Survey Findings

Service Station Units

1. 59 sites were surveyed – 52 of these sites had fully operative tyre inflation facilities.

2. 5 sites were inoperative – 4 of these were not fitted with the inflator/gauge unit and 1 was missing both the inflator and the hose. See further discussion at dot point 23.

3. Disappointingly, 2 sites did not offer a tyre inflation facility at all. 1 of these sites is particularly busy and on the start of a major highway.

4. Of the 52 operating sites – 34 were fitted with mechanical style inflator/gauge units and 18 had electronic units with a required pressure preset function.

5. The electronic units were mostly found to be more accurate with 94.4% accurate within 5%, only one unit recording greater than 5% inaccuracy. (5% @30psi = 1.5psi).

6. The worst of the electronic units recorded a 5.7% inaccuracy @ 30psi (equal to 1.7psi under-inflation of the tyre).

7. Of the mechanical units, only 67.6% were within the 5% range.

8. The worst of the mechanical units (excluding those that could not be read clearly or be set at the test pressures – see dot points 9 & 10 below) was 17.8% inaccurate. At 30psi that equates to 5.34psi under-inflation, a cause for significant concern, given the risk of tyre failure.

9. 1 mechanical unit wasn't capable of inflating the test spacesaver tyre to the required 60 psi. test pressure. 48psi was the most it could manage.

10. 2 mechanical units exhibited faults that prevented accurate readings – 1 had a gauge that was 'sticky' in operation giving reading variations and 2 others had damaged gauge glasses making it effectively impossible to accurately read the pressure scales.

11. A number of the mechanical type gauges showed signs of wear and rough treatment. However in most cases outward appearance wasn't a reliable indicator of likely accuracy, with many of the worn looking units still acceptably accurate.

12. The accuracy of the electronic units is, at least in part, likely to be related to the gauge unit being wall mounted and thus not subject to the same sort of rough handling a mechanical gauge on the hose end may endure.

13. 1 electronic unit's set pressure indicator 'beep' was inoperative/ disconnected.

14. The electronic units and their hoses and inflation couplings all appeared in sound condition. Hose length on a couple of units was considered only just acceptable for access to all wheels.

15. Hose length and condition was far more variable on the mechanical units. Most were considered acceptable to good. 5 units had unacceptably deteriorated hoses – 3 of these were considered likely to pose a risk of rupturing. 7 examples had hoses too short or barely sufficient to service all wheels positions.

16. A few of the mechanical units had leaky inflator couplings.

17. Nearly a third of the rated sites received a 'poor' or 'marginal' score for user safety. In most cases this was due to the tyre inflation bay being too close to busy site entries/exits or having inadequate space between users and forecourt traffic, dangerously exposing users to moving vehicles.

18. There were two standout examples of unacceptable safety. One was an inflation bay located next to the exit of the sites automatic carwash and directly in front of the ingress/egress for the sites mechanical workshop. It was also close to traffic flow away from the pumps. The other was located behind a hedge immediately by the site's entrance from a very busy main road. Cars enter the site at fairly high speeds to avoid being impacted by the car behind and the hedge effectively prevents vision of inflation bay users and entering cars from one another. A user could easily move back into the path of a vehicle.

19. Access to the inflation bay was considered poor in approximately 14% of surveyed sites.

20. Our survey's findings in relation to safety and accessibility suggest that siting of this facility is a low priority at site planning stage.

21. Approximately 36% of the sites scored a 'poor' rating for the adequacy of lighting in the inflation bay area. Some of these had no lighting at all. Sufficient light should be provided to ensure good visibility for valve cap removal/refitting and accurate inflation of all tyres on the vehicle at night. It should be noted that not all sites in the survey group would trade at night and hence the need for suitable lighting for night usage would in many cases be of less significance. Ironically, one site with

particularly good inflation bay lighting would fall into this group (regrettably, it scored poorly for gauge condition and accuracy).

22. The importance of good lighting levels at sites that offer electronic inflation stations is mitigated to some degree as these units incorporate an audible ‘beep’ to signify that the correct preset pressure has been reached. The pressure is displayed on a digital readout that would be easier to read in lower light levels than the markings of a mechanical gauge also.

23. In our survey group, electronic units were more commonly found at Shell, BP and 7-Eleven sites.

24. A number of the electronic stations were fitted with a decal that gave users a guide inflation pressure for various vehicle type tyres. No mechanical units had this feature.

25. Sites noted in dot point 2 above as not having the inflator/hose installed are likely to make these items available on request to the console operator. We believe this is likely to prevent recurring theft/vandalism.

26. Site operators are to be commended for continuing to offer this free facility to motorists, especially given the cost of equipment, and the on-going likelihood of theft or damage of gear. Clearly though a number of sites need to do more to ensure their equipment is accurate and in better condition.

27. Motorists for their part also have a responsibility to ensure they respect the equipment provided free for their use to ensure the continued provision of accurate equipment in good condition. This will benefit users and providers of the equipment.

28. The Office of Fair Trading advised that there is no requirement for this type of equipment to be tested on a regular basis or to meet any standards for accuracy, as would be the case for a service station’s fuel dispensing equipment.

29. From the survey findings, it would appear that the most reliable method of determining correct inflation pressure is for motorists to carry a known accurate, good quality gauge of their own. (See new gauge survey below)

30. Alternatively, seeking out a site that offers an electronic inflator gauge unit is likely to offer a reasonably reliable and accurate result.

New Tyre Gauges

1. A range of types, brands and prices were included in the test, however it was only a small sample of product where a wide range of brands is available. The tested gauges were sourced through popular national auto suppliers and a major variety store. Product selection was based on a reasonable sample of those sold at these outlets.

2. Gauge styles were pencil, dial and electronic.

3. The cheapest units available were the pencil style starting around $7.00. One pencil gauge tested retailed for around $16.00.

4. The dial types tested started around $11.00.

5. Electronic versions with digital readout were available between approximately $15.00 and $20.00.

6. One of the cheaper pencil gauges (the Aunger LG103) was graduated in psi only despite the packaging indicating the gauge had kg/cm_2 markings also.

7. All other gauges offered psi and at least one metric pressure scale.

8. One electronic gauge offered four units of measurement with the ability to convert between scales. The other offered psi and bar.

9. All gauges, with the exception of one pencil gauge (the PCL), read to at least 60psi. Its maximum reading was 50psi. The maximum read by any of the tested units was 120psi.

10. The markings on the cheaper pencil gauges were coarse and made an accurate reading hard to obtain.

11. The more expensive PCL gauge looked well made and was clearly engraved with fine graduation lines that were far easier to read accurately. Its pressure readings were very close to true. It was the best of the tested pencil gauges and could be recommended.

12. The dial gauges offered significantly better accuracy than the cheaper pencil gauges and were easy to read.

13. One of the electronic gauges, the Super Gear TY2000A, offered acceptable accuracy, however the other unit was out by more than 5% (-8.3% @ 30 psi).

14. Instructions were provided with all units excepting the PCL pencil gauge where no instructions were provided. Instructions were on the packaging excepting the Jamec-PEM dial gauge. Its instructions were the best and were attached to its hard plastic storage case, a handy item for helping to keep the gauge in good condition.

15. The most accurate gauge tested was the Jamec-PEM dial gauge. Its readings were virtually identical to our test master gauge. It was well finished and has the largest dial and was easiest to read. It was also the most expensive unit tested at around $33.00.

16. The Aunger dial unit offered acceptable accuracy coming in with less than 4% variation and looked to be of acceptable quality. It was more economically priced at around $11.00.

17. Only two gauges on test were inaccurate by more than 5% (one electronic unit and one of the cheaper pencil gauges).

18. Whilst the cheaper gauges are reasonable for the price, it seems that you get what you pay for, with the Jamec-PEM dial unit the clear leader where accuracy and quality are concerned. It was marked in psi and KPa the two most common pressure units quoted on vehicle tyre placards. Features such as a hard storage case, hold function and the largest dial face add to its attractions. Of the units tested, it was our primary recommendation.

19. The PCL pencil offers an accurate and cheaper alternative. It is marked in psi and KPa. and features a plastic cap to prevent dust entry or damage to the plunger. The cap doubles as a handy valve core depressor and removal tool.

20. The Aunger dial was also considered a good buy with acceptable accuracy, ease of use and a more budget-friendly price. Price is similar to the PCL pencil gauge.

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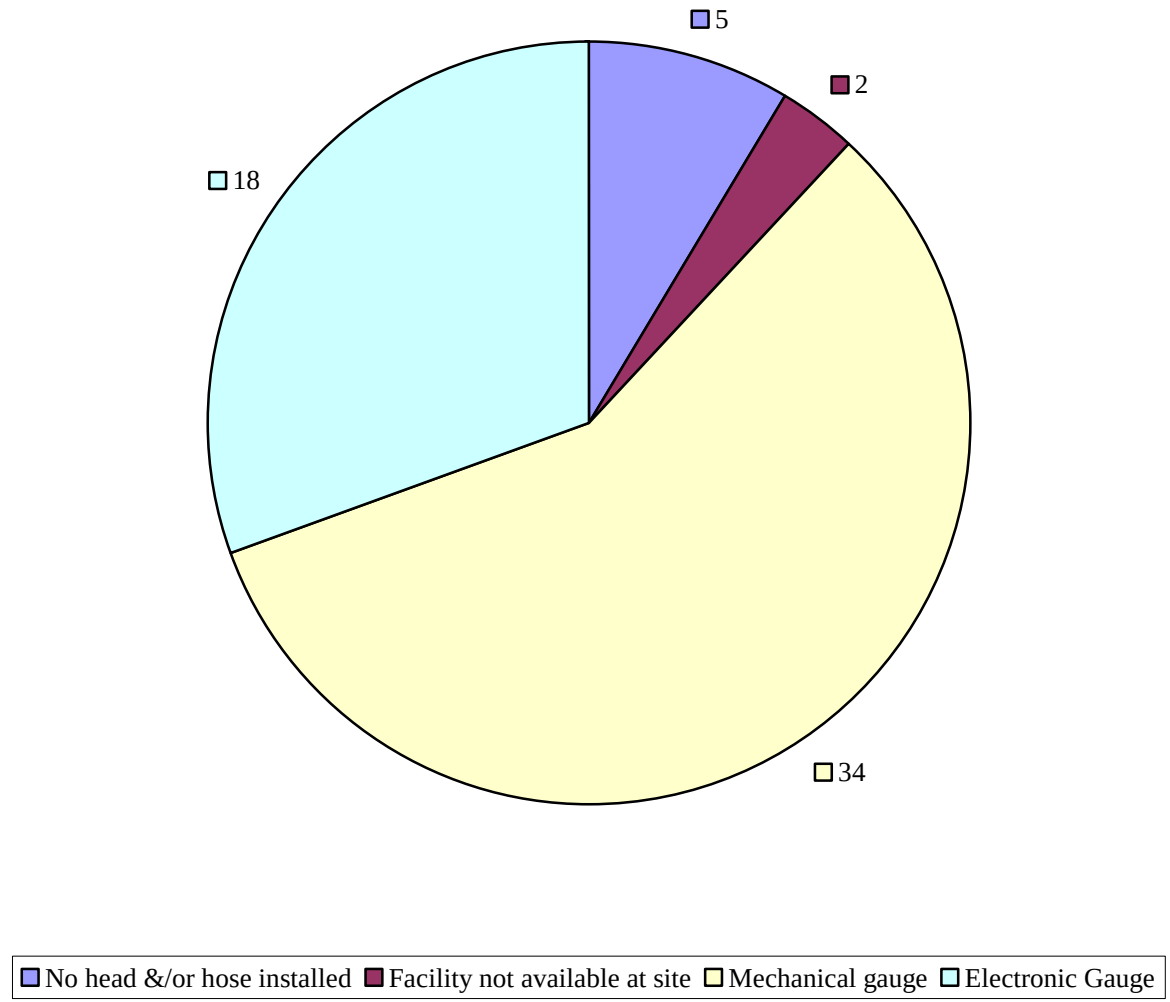
Overview of 59 sites sampled



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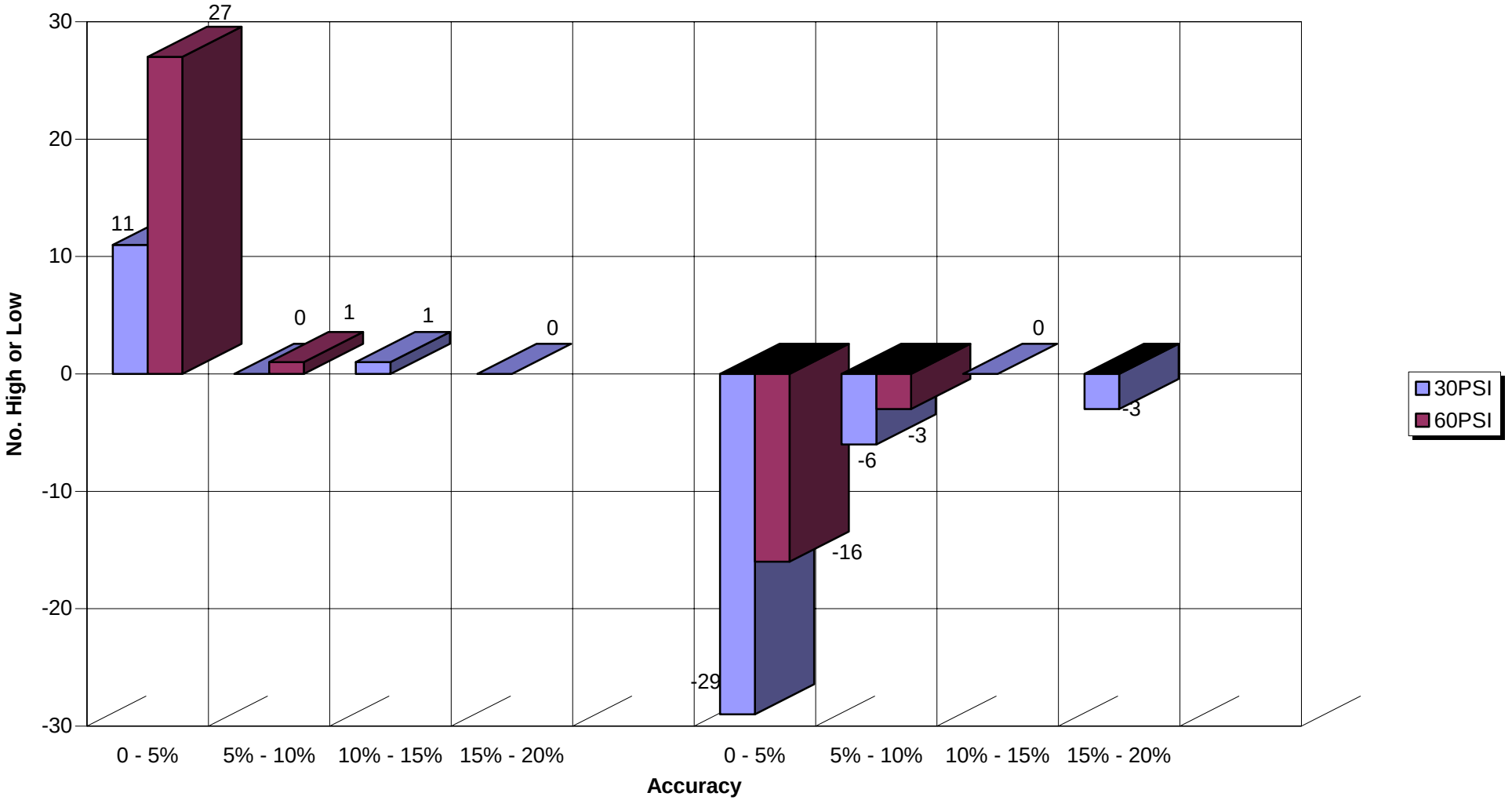

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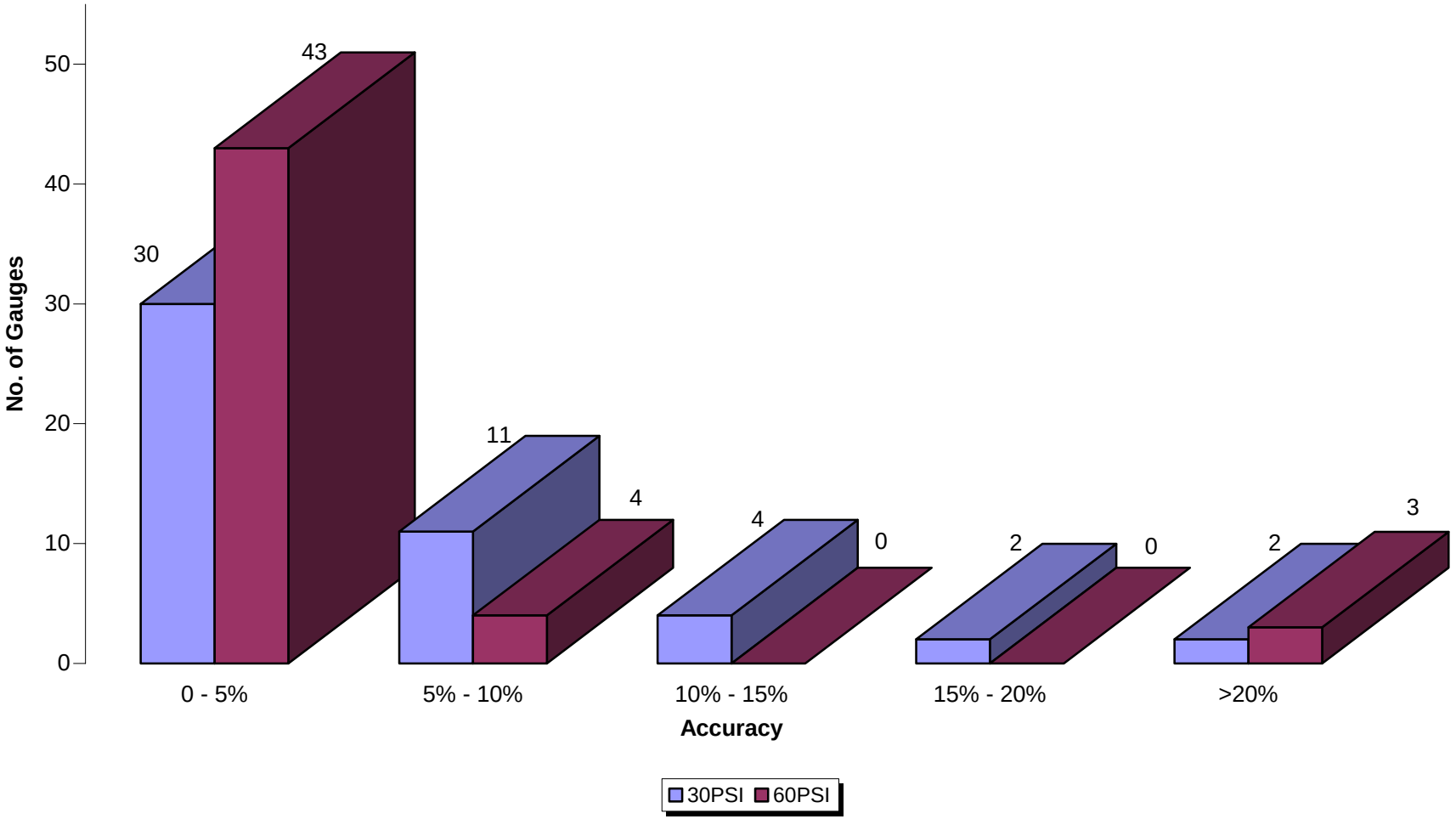
Gauge Accuracy



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Proportion of 59 Units Sampled