

# AUTOMOTIVE DASHBOARD INDICATOR : CONSEQUENCES OF DIFFERENT TYPES OF INDICATOR TO THE DRIVER

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## ABSTRACT

Automotive dashboard indicator is a way of interaction between cars and drivers. Located on the instrument cluster, it indicates usage of some features or function in a type of symbol or acronym such as handbrake, lamps and also as a warning to the driver a malfunction of some components or current condition of the car. The introduction of new electronic or safety features also contributes to the existence of new indicator on instrument cluster. However, some drivers are not aware of the important usage of this indicator. Drivers who understand a certain indicator are confused when they found a same indicator but presented in different symbol or acronym in some models of cars. This study investigates the possible consequences when some indicators are displayed in different symbols or acronyms. The focus is on a possibility of confusion and distraction while driving. A quantitative method has been used as it can easily gain results based from the questionnaire survey into the numerical data. Regarding to the result of this study, it is found that different types of some indicators raise confusion among drivers and there is a need to standardize these indicators. Therefore, this study will benefit the automotive manufacturers to revise a design of indicators that can be easily recognized and user friendly, hence will raise awareness among drivers the importance of those indicators to assist them while driving.

**Keywords:** *Acronym, Automotive, Dashboard Indicator, Symbol*

## 1.0 INTRODUCTION

Vehicles are changing in terms of styling, technology and features. Among those changes is the growing number of indicators on the instrument cluster based on a features or equipped system. The indicators are displayed in the form of pictorial (Symbol) or text (Acronym). In line with current technology of automotive world, the usage of instrument cluster has been more sophisticated. Automotive manufacturers compete to introduce the latest technology inside a modern car. In the interior of a vehicle, the purpose of indicator can be considered as guidance as well as a reminder to the drivers regarding their vehicle function and condition. This entire indicator has a meaning and some of its types have a standard design and colour code that must be followed by automotive manufacturers in the world. Since 1980s, the design and function of indicator in a vehicle have increased till date and more new features in a modern vehicle were created to interact with drivers following the technology and vehicle segment. As discussed in a website article dashboardsymbols.com website entitled “*What is that light on my dashboard*” (2010), every year, a new feature are added to vehicles, each of which is accompanied by a new symbol or acronym.

In modern vehicle, indicator lights are used as a reminder to the drivers before and while driving. As discussed in the *dashboardsymbol.com*, the International Standards Organization (ISO) establishes symbols for use on controls, indicators and tell-tales applying to passenger cars, light and heavy commercial vehicles and buses, to ensure identification and facilitate use. It also indicates the colours of possible optical tell-tales, which are supposed to inform the driver of either correct operation or malfunctioning of the related devices.




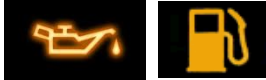


The indicators will appear on instrument cluster and illuminate to alert drivers when they turn the ignition switch to ON position, while some will remain until the drivers react to the situation that makes the lights on. Baber and Wankling (1992) have classified warning lights into three classes which are state information, advisories and warnings.

Table 1.1: Three classes of warning lights

CLASS	PURPOSE	EXAMPLE
State Information	To inform the drivers the state of driver controlled functions and are normally “On” or “Off”.	Indicators, main beam, hazard lights.
Advisories	To inform the drivers on vehicle states which require attention in the near future.	Fuel low, bulb or fuse failure, brake pads worn.
Warnings	To inform the drivers on vehicle states which require immediate attention.	High engine temperature, Low oil pressure

Normally, the indicators are illuminated by using standard colour code. Blue and green lights are used as the information indicator to drivers. Orange or amber lights mean the problem should be checked at the earliest convenience while red lights indicate a problem that should be checked immediately.

Table 1.2: Standard colour code and meaning for symbol on instrument cluster

COLOR	MEANING	EXAMPLE
	Information	
	Checked	
	Checked Immediately	

Position or arrangement of each symbol on instrument cluster is also different between types or models of the car. Each manufacturer has their needs in designing variable layouts of meter cluster, but basic indicators remain. Some manufacturers also add some new indicators based on types of models and features inside. For instance, figure 1.1 shows that the instrument cluster of Perodua Myvi 2012 has simple layout compared to 2013 Honda CRV that has much more additional indicators.



Figure 1.1: 2012 Perodua Myvi Instrument Cluster (Left) and 2013 Honda CRV Instrument Cluster (Right). Source: www.paultan.org

## 1.1 PROBLEM IDENTIFICATION

Airbag, Anti-Lock Braking System (ABS), and Vehicle Stability Control are some of the new tech-based features installed in a current vehicle. It means that there will be a new indicator on the instrument cluster of the vehicle to indicate the function of those features. To date, the International Standards Organization (ISO) has defined over 220 of indicators and growing. Those indicators are supposed to be identified easily by all people everywhere in the world regardless of language and background. Some indicators also indicate a same function but has a different design. For example, an indicator for Cruise Control, Parking Brake, Check Engine and Vehicle Stability Control (VSC) as seen in figure 1.2, some automotive manufacturer uses those indicators in a form of symbol and some of them use a text type indicator.

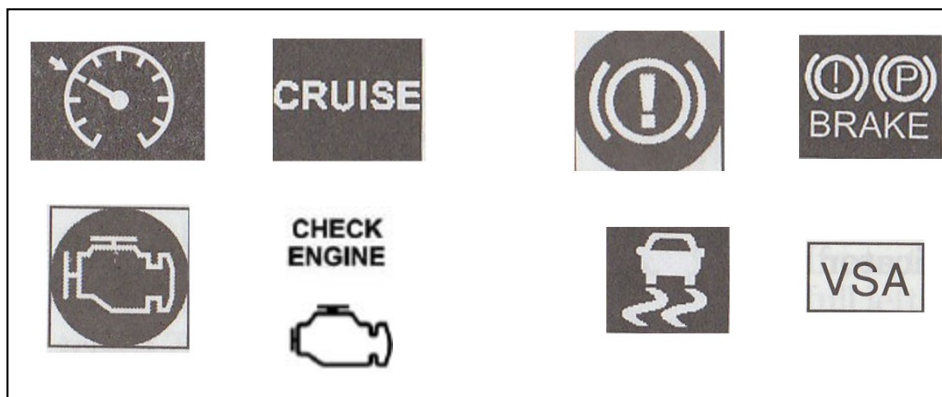


Figure 1.2: Sample of indicator in a form of symbol and text type.

When the number of indicators is growing, drivers had to face its consequences. Baber and Wankling (1992) noted that “a dramatic increase in the number of warning lights on a single dashboard results in excessive information load for a driver and problems of interpreting the mass of information displayed” (p.255). This statements also supported by the article in *dashboardsymbols.com* entitled “*What the Hell is that Light on My Dashboard*” (2010) drivers are frustrated, afraid and sometimes even angry at the growing number of these seemingly senseless symbols. Stewart and Young (2011) found that based on advance in technology, motivations of manufacturers and consumer demand, the amount of instrumentation in modern vehicle has increased and this added information (indicators) raises significant ergonomic concerns for driver mental workload, distraction and driving task performance so that more ergonomic approach would be to treat the cause by focusing on the appropriate design of in-vehicle information system (IVIS) (p.484).”

In other situation, some symbol has a different design A different types of indicator also lead to the driver’s inattention while driving. A ‘100-car naturalistic study’ completed in the US suggested that driver inattention accounts for almost 80% of crashes and 65% near crashes. Klauer, Dingus, Neale, Sudweeks & Ramset, (2006) found little evidence of distraction from IVIS system which include the indicators, plays in the number and severity of road accidents (p.575).

One of the cases a pictorial symbol has been misunderstood by drivers has been discussed is the TPMS ([Tire Pressure Monitoring System](#)) indicator which is the single most misunderstood and maligned trouble light seen on instrument panel as discussed in *dashboardsymbol.com* website entitled “*The Single Most Misunderstood Warning Indicator on Your Instrument Panel*” (2010). In United State (US), a car or light duty vehicle manufactured after September 2007 has equipped with TPMS. According to a statement entitled “*When will the New TPMS be Available?*” (<http://www.safecar.gov>), U.S. government through National Highway Traffic Administration requires all passenger car, light trucks and vans equipped with this system starting 2008.



Figure 1.3: Tyre Pressure Monitoring System (TPMS) Indicator.

According to the same articles, under the category of misunderstood, this TPMS light has been described variously by drivers as:

- An exclamation points in parenthesis
- An exclamation points in brackets
- An exclamation points in a horseshoe
- Flames – destined to be a classic
- A wishbone
- An exclamation point in a fish bowl
- An exclamation points in a cup
- A candle in a glass.

Further discussion in the article of the TPMS misunderstood issue, never has anyone of the drivers called and said “I have an exclamation point in the cutaway of a tire” – which is exactly the correct answer.

This issue has giving a point that not all drivers clearly understand some symbols and indicators in their cars. Back to the articles, it also describes that *under the category of maligned, everyone from drivers to service personnel, believe this symbol is nothing but a pain in the neck* [italics added]. But, in truth, it is doing its function; too give attention to the driver a fact that the pressure in one or more of their car tires is low. The long-term advantages of using TPMS if the indicator illuminate, it will save money spending on replacing new tires because of it will reducing rolling resistance. It also can extend the tire lifespan and a gas inside.

In this article also, they suggest four possible scenarios according to TPMS indicator issue:

All the tires are low on air. This occurs seasonally as the weather cools, and possibly several times. As a solution, drivers need to check the pressures and inflate the tires properly.

One tire is low. This likely means a nail or other fault causing the tire to leak slowly. By checking all the tire pressures, it will reveal a single tire to be low. A qualified service facility will be needed to address the problem.

The system needs to be reset. If drivers recently had the tires rotated or replaced, check with car manufacturer dealer about resetting the TPMS system.

If the light is flashing, there is a fault in the TPMS system, which car manufacturer dealer will have to resolve. In the first three cases, the light is simply illuminated, not flashing.

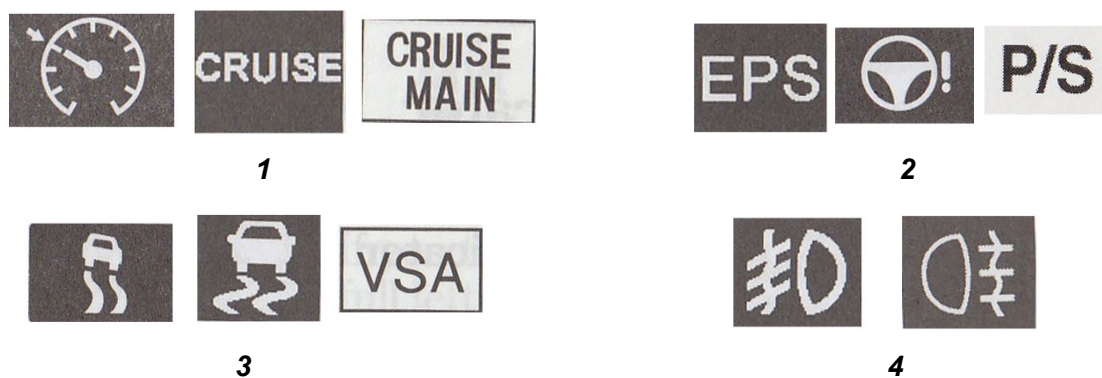
## 2.0 METHODS

The intention of this study is to determine a consequence the use of different type of indicators found on instrument cluster in various brand of the car. In order to achieve this, it is crucial to get a perspective viewpoint from drivers of the car itself the possibility their focus on while driving is distracted due to different types of indicators. The quantitative approach was selected as a method for this study because it can easily gain results based on the questionnaire survey into the numerical/statistical data that can describe the effects of different indicators on instrument cluster of the vehicle. Quantitative studies have results that are based on numeric analysis and statistics. Duangtip Charoenruk (Dr) in his articles, “*Communication Research Methodologies: Qualitative and Quantitative Methodology*” (2014) explains that quantitative research is described by the terms ‘empiricism (Leach, 1990) and ‘positivism’ (Duffy, 1985).]. Quantitative approach is fast and economical and is suitable when time and resources are limited, suitable with this research because the reference related to the indicator, symbol & acronym is limited.

To gather the data for this study, several 70 questionnaires were distributed through a survey to 70 drivers or users that has been randomly selected. The criteria of the selected participant were based on their age, career, gender and driving experience. The non-experimental research has been using in this research in order to gain reliable results as it also known as survey research. Chua (2012) agree the advantages of this research is it can be used widely as it was useful in explaining attitudes, views and behavior, easy to conduct by using questionnaire, the data can be quickly collected by using large samples, data collected directly from participants and the results can be generalized. To compare a different design of indicators, a sample from three automotive manufacturer has been use which is Proton, Toyota and Suzuki.

### 3.0 FINDINGS

Based on the data analysis results, most participants were confused by an indicators which is (1) Cruise Control System, (2) Electric Power Steering System (EPS), (3) Electronic Stability Control (ESC) or Vehicle Stability Control (VSC) System and (4) Front (Left) and Rear (Right) Fog Lamp. This is because it has a different type of indicators based on the brand of the car. However, those indicators has represent a same features except for front and rear fog light.



There is a driver who is confused with a function of rear fog light indicator. It serves as a warning lamp to the vehicle behind when the weather is foggy, snowy or heavy rain. In, Malaysia, this function can be found on the car as it was a compulsory feature by Road Transport Department following the UNECE regulations since 2012. Based on data analysis, 53 out of 70 participants are confused with this indicator. This result is a proof that it can be found drivers are misused this features because they assuming it represents an indicator for front fog lamps. A light from rear fog lamps is very bright than a rear combination lamps and distracting other drivers on the road when the drivers misused this function in an unacceptable state.



Figure 1.4: A symbol represent front fog lamp (left) and rear fog lamp (right) and, the position of the rear fog lamps on the car

Source: dashboardsymbol.com & brokenssecrets.com

With various automotive brand sold their vehicle currently, it is possible an indicator will have different design and keep growing. It requires drivers especially new one to always be alert the changes on the indicators design to reduce a possibility of lost concentration while driving.

#### 4.0 CONCLUSION AND RECOMMENDATION

Different indicators can lead to confusion to the drivers if the indicators have a different design according to vehicle brands but represent the same function. Drivers can also be confused if they see a new indicator that represents new features inside the vehicles, and therefore owner's manual book needs to be used.

Suggested recommendation for this research is based on analyzed results from the questionnaire survey. Indicators on instrument cluster inside vehicles help or guide drivers or users to always be alert before, while and after they drive any vehicle. A Road Transport Department should create a guideline on a standard design of indicators especially the important indicators for automotive manufacturer. This can be done with a cooperation with Malaysia Design Council and Standard and Industrial Research of Malaysia (SIRIM) to standardize indicators design on instrumentation panel. Also, a syllabus content in driving school should have an information about the basic indicator inside the vehicle to enhance knowledge of new drivers about the function and features inside the car.

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