

- Research and Consulting
- Systems

CONTRACT REPORT

Sign Symbol Testing

Project No: 010636

by

33(1)

for

VicRoads

Released Under the Freedom of
Information Act 1982
Roads Corporation

Sign Symbol Testing

for VicRoads

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SUMMARY

ARRB Group was commissioned by VicRoads to identify suitable symbols for ten road signs which complied with the requirements of *AS2342: Development, testing and implementation of information and safety symbols and symbolic signs*.

Up to three images were selected for each of signs and subjected to a reference test, in which participants identified the image which they believed would be most effective in conveying the intended message. The image that attracted most preferences for each of the ten road signs was selected for the next steps in the selection process.

The signs were subject to a legibility test, in which participants walked towards a scaled-down version of the sign and noted the distance at which the sign was recognised.

Signs were then subject to a recognition test, in which participants were asked to write down what the sign meant before the meaning was explained to them. One week later participants were subject to the recall test, in which they were asked to recall the meaning of each of the signs.

In all cases, the preferred symbol from the preference test performed adequately on the visibility, recognition and recall tests, indicating that they were suitable for use on the road. The signs identified were:

Information signs

- playground
- port
- racecourse
- ferry.

Warning signs

- cyclist dooring
- deer
- golfer
- golf buggy.

Regulatory sign

- transit lanes.

Symbol for use on other signs

- motorbike
- taxi.

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CONTENTS

1	INTRODUCTION	1
1.1	Background	1
1.2	Project Aim	1
2	METHODOLOGY	2
2.1	Preference Testing	2
2.1.1	<i>Selecting Alternatives for Testing</i>	2
2.1.2	<i>Conducting the Preference Tests</i>	2
2.2	Legibility Testing	2
2.3	Recognition and Recall Testing	3
3	SUMMARY OF RESULTS	4
3.1	Information Signs	4
3.1.1	<i>Playground Symbol</i>	4
3.1.2	<i>Port Symbol</i>	4
3.1.3	<i>Racecourse Symbol</i>	5
3.1.4	<i>Ferry Symbol</i>	6
3.2	Warning Signs	6
3.2.1	<i>Cyclist Dooring Symbol</i>	6
3.2.2	<i>Deer Symbol</i>	8
3.2.3	<i>Golfer Symbol</i>	8
3.2.4	<i>Golf Buggy Symbol</i>	9
3.3	Regulatory Signs	10
3.3.1	<i>Transit Lane Symbols</i>	10
3.4	Symbol for Use on other Signs	11
3.4.1	<i>Motorcycle Symbol</i>	11
3.4.2	<i>Taxi Symbol</i>	11
4	DISCUSSION AND CONCLUSIONS	13
4.1	Discussion	13
4.2	Conclusions	13
APPENDIX A	COMPLETE RESULTS	14

TABLES

Table 2.1:	Gender and age distribution of recognition and recall participants	3
------------	--	---

FIGURES

Figure 3.1:	Most preferred playground design.....	4
Figure 3.2:	Most preferred port design	5
Figure 3.3:	Most preferred racecourse design.....	6
Figure 3.4:	Ferry design.....	6
Figure 3.5:	Most preferred cyclist dooring design.....	7
Figure 3.6:	Cyclist dooring design as pavement marking	7
Figure 3.7:	Deer warning design	8
Figure 3.8:	Most preferred golfer design	9
Figure 3.9:	Golf buggy design	10
Figure 3.10:	Transit lane designs.....	10
Figure 3.11:	Most preferred motorcycle design	11
Figure 3.12:	Most preferred taxi design.....	12

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1 INTRODUCTION

1.1 Background

VicRoads has recognised the possible need for a number of new symbol signs and in response has commissioned ARRB Group to establish suitable versions of these signs that meet the requirements of the relevant Australian Standards. The catalyst for this project was a result of work carried out by the City of Darebin to identify a suitable symbolic sign to warn cyclists of the risk of 'dooring', i.e. where cyclists are struck by a vehicle door which unexpectedly opened into their path.

The symbol signs identified by VicRoads included:

Information signs

- playground
- port
- racecourse
- ferry.

Warning signs

- cyclist dooring
- deer
- golfer
- golf buggy.

Regulatory sign

- transit lanes.

Symbol for use on other signs

- motorbike
- taxi.

It should also be noted that a dooring symbol is also intended to be used as a pavement marking and that this also needed to be assessed.

1.2 Project Aim

The aim of this project is to identify the most easily read and understood symbol for each of the above applications. This is sought to be achieved by selecting the most appropriate symbol from the alternative versions available, then testing the legibility, comprehension and recall of the preferred symbol to make sure it is fit for purpose.

2 METHODOLOGY

2.1 Preference Testing

2.1.1 *Selecting Alternatives for Testing*

Ideally, all symbol signs should be subjected to the preference testing procedure, which identifies the symbol that users think is most likely to convey the intended message. Three versions of the symbol, each differing substantially in the view of the image or the relation of the image to the meaning were used.

In the case of the dooring symbol, a number of possible versions had been assembled, however, many of them differed only slightly. The three versions that were selected by the project team were judged to encapsulate the major differences between the many versions. As multiple versions of the playground and port symbols were also available a similar selection process was used. Since only one version of the racecourse symbol was available, possible alternatives were developed for preference testing. For some of the other symbols, the team could think of no credible alternative to the symbol available, so preference testing was omitted in these cases and the other tests were conducted on the only available symbol.

2.1.2 *Conducting the Preference Tests*

The preference testing/interview involved showing participants three versions of each sign which differed in the type of image used to convey the intended meaning of the sign. Each participant was interviewed individually. Participants were shown the three versions of the sign at the same time and told the intended meaning of the sign. They were then asked to rank the three versions according to how well they conveyed the intended message, and then asked to describe why they thought their first pick was the best choice for the use in question. Finally, they were asked if there were any issues with understanding the elements on any of the signs.

The preference testing was undertaken at the VicRoads Burwood Road offices, which comprised testing 48 people – eight people from three different age groups (under 30, 30 to 60 and over 60 years of age) for both genders. Respondents were offered a \$20 gift voucher for either Coles or Woolworths as an incentive to complete the test.

Preference testing was performed for the cyclist dooring, racecourse, playground, port, golfer, taxi and motorcycle signs.

Only the preferred version of the sign went forward for legibility, comprehension and recognition testing. The images for the legibility, recognition and recall tests, showed the appropriate shape and colour coding for the class of sign intended (i.e. white symbol on a blue square for information signs, black symbols on a yellow diamond for warning signs, etc.).

2.2 Legibility Testing

The legibility testing was performed along an upper level covered breezeway of an approximate length of about 30 m at ARRB Group's offices in Vermont South. The breezeway was enclosed by a wall on one side, and had good natural light with no direct sunlight falling on the viewing area at any time of day. Testing lasted less than ten minutes so that lighting conditions would have been similar as each subject viewed the entire set of signs. Participants were tested individually, using scaled-down versions of the signs computer-printed in full colour on standard office A4 paper. They were first shown all the signs close up to ensure they understood the elements of each sign and its meaning. They then moved 20 metres back from the tester to the start point where they reset a surveyor's measuring wheel to zero. The tester held a sign up for viewing and the participant

walked forward until they could identify the sign. At that point, the participant read out the distance on the measuring wheel, and the experimenter recorded it. Successive signs were presented according to a randomly assigned order; each participant viewed the entire set of signs. The measured distance was used to calculate the distance from the sign at the point it was identified by the participant. These distances can be scaled up to produce an estimate of the visibility distance for full-size signs on the road network.

The design with the highest preference score was tested for visibility, along with symbols for ferry, deer and transit 2 and 3 lanes (with the exception of the golfer symbols, where the two designs were both tested for visibility). Additionally, the dooring symbol with the highest preference score was viewed in black and white (to mimic a pavement marking), on a tilted plane to ensure the symbol was still legible at an angle.

Five males and five females participated in the legibility testing.

2.3 Recognition and Recall Testing

Due to time constraints, the recognition and recall testing was conducted using the online survey tool, SurveyMonkey, rather than the face-to-face form of testing envisaged in AS 2342: *Development, testing and implementation of information and safety symbols and symbolic signs*. The testing procedure ensured that, despite the change in platforms, the essential feature of the testing was maintained, i.e. an initial recognition test after which the sign's intended meaning is explained, followed by a similar test one week later.

The survey was circulated and advertised using online networking tools (i.e. Facebook and LinkedIn), and email contacts, with initial participants being encouraged to recruit friends and acquaintances.

Once the participant logged in, the survey began by showing the first sign and asking the participant to write down what they thought it meant. Once they had done this, they were told what the intended meaning was and then asked if they had any questions, concerns or comments regarding each symbol. The survey then proceeded to the next symbol, repeating the sequence, until the entire set of symbol signs had been completed. At the end of the survey respondents were asked to fill in their email address so they could be contacted in a week's time for the recall testing.

Respondents who provided their email addresses were contacted exactly one week later with a link to the recall testing survey. The same questions were asked as in the first survey, providing respondents with opportunities to provide additional comments on the symbols.

The aim was to collect responses from 100 respondents in both the recognition and recall testing, with a range of ages and even distribution of gender. In the first survey 134 responses were collected, and 90 were successfully re-tested a week later. Respondents were offered a \$10 gift card for either Coles or Woolworths as incentive for completing both tests.

The distribution of age and gender during the recognition and recall testing is shown in Table 2.1.

Table 2.1: Gender and age distribution of recognition and recall participants

	Male	Female
Number of respondents	43	47
Mean age	34.7	34.6
Standard deviation	12.1	11.4

3 SUMMARY OF RESULTS

The following sections show the results for the most preferred design. Complete details for the preference testing for each version of the sign, and of the legibility, comprehension and recall testing are shown in Appendix A.

3.1 Information Signs

3.1.1 Playground Symbol

The most preferred playground design is shown in Figure 3.1. The number of respondents who selected this design was:

- 23 as their first preference
- 18 as their second preference
- 4 as their third preference.

Three respondents did not give their preferences (e.g. felt that no sign was appropriate).

The main reason respondents felt this sign was preferable was that the symbol was obviously a seesaw (which is identified as part of a playground), and was kept very simple.

The visibility testing gave a mean distance of 16.1 m and a standard deviation of 6.2 m, which equate to approximately 180 m and 70 m respectively for a full-sized sign (assumed to be 900 mm tall/wide).

The recognition testing showed that the majority of respondents understood what the sign was for, with 81 respondents giving the correct answer and 9 giving an almost correct answer (directions to a park, and not specifically a playground). None gave an incorrect answer.

Eighty-nine respondents out of 90 gave the correct response in the recall testing.



Figure 3.1: Most preferred playground design

3.1.2 Port Symbol

The most preferred port design is shown in Figure 3.2. The number of respondents who selected this design was:

- 24 as their first preference

- 13 as their second preference
- 9 as their third preference.

Two respondents did not give their preferences (e.g. felt that no sign was appropriate).

The main reason respondents selected this sign as their first preference was that it showed the clearest elements of a port, without the sign being confused for something else related to the sea. However, some felt that the sign was too busy and a bit ambiguous.

The visibility testing gave a mean distance of 14.3 m and a standard deviation of 7.3 m, which equates to the sign being visible at approximately 215 m and 110 m respectively for a full size sign (assumed to be 1200 mm tall/wide).

The recognition testing results found that 86 respondents gave the correct response, 3 gave an almost correct response and one gave an incorrect response. The incorrect response was for a respondent who thought the sign was an industrial area.

Eighty-nine respondents out of 90 gave the correct response in the recall testing.

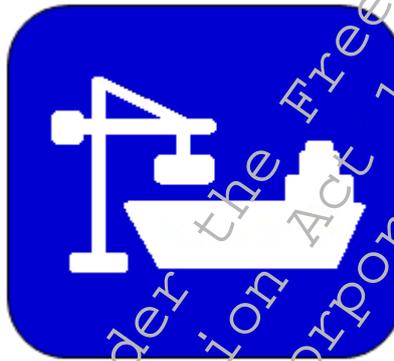


Figure 3.2: Most preferred port design

3.1.3 Racecourse Symbol

The most preferred racecourse design is shown in Figure 3.3. The number of respondents who selected this design was:

- 26 as their first preference
- 1 as their second preference
- 18 as their third preference.

Three respondents did not give their preferences (e.g. felt that no sign was appropriate).

The main reason respondents felt this sign was preferable was that it was obviously a racetrack, and that the horse symbol used was the same as Racing Victoria. However, others felt confused by the shape around the horse and did not identify this as a racetrack.

During the visibility testing, the mean distance participants could recognise the scaled-down version of the sign was 10.0 m, with a standard deviation of 7.7 m. These values equate to approximately 150 m and 115 m respectively for a full-sized sign (assumed to be 1200 mm tall).

The recognition testing showed that the sign was highly recognisable to respondents with 85 giving the correct response. One respondent gave an almost correct response and four gave incorrect responses. The main incorrect response was that the sign was for a horse crossing.

Eighty-nine respondents out of 90 gave the correct response in the recall testing.



Figure 3.3: Most preferred racecourse design

3.1.4 Ferry Symbol

As there was only one image to be tested, the ferry symbol was not subjected to preference testing.

The mean distance was 14.6 m with a standard deviation of 5.9 m in the visibility testing. This equates to approximately 220 m and 90 m respectively for a full-sized sign (assumed to be 1200 mm wide).

In the recognition testing, 83 respondents gave the correct response, six gave an almost correct response and one gave an incorrect response. The majority of the almost correct answers were other sea-related responses such as 'port', 'dock' or 'ship'.

In the recall testing all 90 respondents gave the correct answer.



Figure 3.4: Ferry design

3.2 Warning Signs

3.2.1 Cyclist Dooring Symbol

The preferred cyclist dooring design by a very small margin, is shown in Figure 3.5. The number of respondents who selected this design was:

- 22 as their first preference

- 21 as their second preference
- 5 as their third preference.

The main reason respondents selected this design was they felt it accurately described the narrative of a cyclist who is at risk of being doored. Many felt that the word 'LOOK' helped emphasise the situation. However, some issues with the design included the amount of blank space on the sign, the clarity of the person getting out of the vehicle and that the use of a non-standard cyclist symbol.

During the visibility testing, the mean distance participants could recognise the scaled-down version of the sign was 10.5 m, with a standard deviation of 6.0 m. These values equate to approximately 80 m and 45 m respectively for a full-sized sign (assumed to be 600 mm tall).

A cyclist dooring design was also assessed for visibility as a pavement marking, as shown in Figure 3.6. The design that was chosen was only slightly less favoured than the most preferred design (Figure 3.5). It was felt that the design could work well as a pavement marking, however there may be too much space between the 'LOOK' and the car symbol.



Figure 3.5: Most preferred cyclist dooring design



Figure 3.6: Cyclist dooring design as pavement marking

The recognition testing showed that the large majority of respondents understood the general idea of the sign with 22 giving the correct answer, 67 getting the description almost correct and one gave an incorrect answer. The 67 participants who answered almost correctly all thought the sign was a warning for drivers and not for cyclists. The one incorrect answer was that the sign was a forewarning for a bike lane ahead.

The recall testing showed promising results, with 40 respondents improving their answers to completely correct. Sixty respondents gave the correct answer, 29 had a description that was almost correct and one gave an incorrect answer. Again, the respondents who gave an almost correct response confused the sign as a warning for drivers and not for cyclists. A number of

respondents commented that they felt that it was more the driver's responsibility to look out for cyclists in these situations.

3.2.2 Deer Symbol

During the visibility testing of the symbolic deer sign shown in Figure 3.7, the mean distance participants could recognise the scaled-down version of the sign was 17.7 m, with a standard deviation of 4.2 m. These values equate to approximately 260 m and 60 m respectively for a full-sized sign (assumed to be 1200 mm long on each side).

Seventy-two respondents gave the correct response in the recognition testing and 17 gave an almost correct response (saying 'wildlife' was in the area, and not specifically deer). One respondent did not answer the question.

In the recall testing, 87 gave the correct response and three gave an almost correct response (again, saying 'wildlife' was in the area).



Figure 3.7: Deer warning design

3.2.3 Golfer Symbol

For the two golf symbols tested, VicRoads requested that regardless of preference testing results both symbols be tested for visibility and recognition/recall.

The most preferred golf design is shown in Figure 3.8. The number of respondents who selected this design was:

- 40 as their first preference
- 6 as their second preference.

Two respondents did not give their preferences (e.g. felt that no sign was appropriate).

The main reason respondents selected this design as their first preference was that it was the clearest and more anticipated image associated with a golf course.

The visibility testing gave a mean distance of 15.7 m and a standard deviation of 6.2 m, which equates to the sign being visible at approximately 175 m and 70 m respectively for a full size sign (assumed to be 900 mm long on each side).

The recognition testing results were 67 out of 90 respondents gave the correct response, and 21 gave an almost correct response. Some respondents thought it was a sign giving directions to a nearby golf course.

Eighty respondents out of 90 gave the correct response in the recall testing, and 10 gave an almost correct response – again confusing the sign as directions to a nearby golf course.



Figure 3.8: Most preferred golfer design

3.2.4 Golf Buggy Symbol

The golf buggy symbol is shown in Figure 3.9. The number of respondents who selected this design was:

- 6 as their first preference
- 40 as their second preference.

Two respondents did not give their preferences (e.g. felt that no sign was appropriate).

Respondents felt this sign was rather ambiguous, and could be confused with a forklift symbol.

During the visibility testing, the mean distance participants could recognise the scaled-down version of the sign was 12.0 m, with a standard deviation of 7.4 m. These values equate to approximately 135 m and 85 m respectively for a full-sized sign (assumed to be 900 mm long on each side).

There was no difference between the recognition and recall results, 88 out of 90 respondents gave the correct answer, and two respondents thought that the sign was for a forklift.



Figure 3.9: Golf buggy design

3.3 Regulatory Signs

3.3.1 Transit Lane Symbols

The transit lane symbols shown in Figure 3.10, were tested to see if respondents could distinguish the difference between the two signs (T2 and T3), from a distance (i.e. visibility testing), and in the recognition and recall testing.

The visibility testing showed that the sign could be seen at a mean distance of 15.4 m, with a standard deviation of 3.5 m. This equates to approximately 125 m and 25 m respectively for a full size sign (assumed to be 600 mm high).

Both signs were tested during the recognition and recall testing.



Figure 3.10: Transit lane designs

In the recognition test for the T2 sign, 82 respondents gave the correct response, two were almost correct and six did not know what the sign was for. In the recall test, all 90 gave the correct answer.

In the recognition test for the T3 sign, which was always after the T2 sign, 89 respondents gave the correct answer and one respondent did not answer. All 90 respondents gave the correct answer in the recall test.

3.4 Symbol for Use on other Signs

3.4.1 *Motorcycle Symbol*

The most preferred motorcycle design is shown in Figure 3.11. The number of respondents who selected this design was:

- 20 as their first preference
- 23 as their second preference
- 5 as their third preference.

The main reason respondents selected this design as their first preference was that it was the clearest and simplest image of a motorcycle. However, some felt that the motorcycle design was old-fashioned and the rider appears to not be wearing a helmet.

The visibility testing gave a mean distance of 15.9 m and a standard deviation of 5.1 m, which equates to the sign being visible at approximately 120 m and 38 m respectively for a full size sign (assumed to be 600 mm wide).

The recognition testing results were 87 out of 90 respondents gave the correct response. The remaining three did not understand the question properly and failed to answer.

Eighty-nine respondents out of 90 gave the correct response in the recall testing.

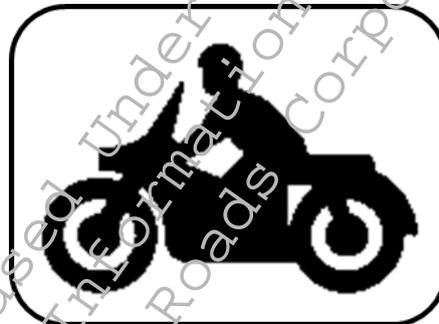


Figure 3.11: Most preferred motorcycle design

3.4.2 *Taxi Symbol*

The most preferred taxi symbol design is shown in Figure 3.12. The number of respondents who selected this design was:

- 25 as their first preference
- 20 as their second preference.

There was little difference between the two designs, however the main reason respondents selected this design as their first preference was that the font size of the word 'TAXI' made it clearer.

The visibility testing gave a mean distance of 15.0 m and a standard deviation of 7.0 m, which equates to the sign being visible at approximately 112 m and 50 m respectively for a full size sign (assumed to be 600 mm wide).

The recognition and recall results were the same – all 90 respondents got the correct answer.



Figure 3.12: Most preferred taxi design

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4 DISCUSSION AND CONCLUSIONS

4.1 Discussion

The limitations of the study were found to be that:

1. The number of participants was relatively small, and not completely representative of road users. There was geographical bias, with most participants in the preference and legibility testing being residents in metropolitan areas.
2. The selection of images to include in the preference testing was not exhaustive, due to the limited time available. With wider searches and canvassing interested parties, a wider range of images may have been identified. However, the set of images examined was sufficient to identify acceptable symbols for all of the signs assessed.
3. The SurveyMonkey survey was a new approach, and untried for this particular application. It had the advantage of being able to replicate the key features of the test procedure used in the conventional form of symbol testing, i.e. ensuring that the respondent provides an answer that cannot be changed, then explaining the intended meaning and returning one week later to test recall of the symbols. Being a screen-based procedure, it is likely to bias respondents in terms of being younger and more computer literate. However, the previous method relied on approaching clubs to recruit groups of respondents; in general this resulted in younger participants who were more engaged in the community. SurveyMonkey is thus a viable method.

4.2 Conclusions

The testing indicated that suitable symbols have been identified for all the signs requested in the brief. Provided the Survey Monkey survey platform is accepted as a valid replacement for the face-to-face method described in AS 2342, the signs meet the requirements for that standard in terms of visibility, comprehension and recall. The symbol signs that meet these criteria were:

Information signs

- playground
- port
- racecourse
- ferry.

Warning signs

- cyclist dooring
- deer
- golfer
- golf buggy.

Regulatory sign

- transit lanes.

Symbol for use on other signs

- motorbike
- taxi.

APPENDIX A COMPLETE RESULTS

A.1 Information Signs

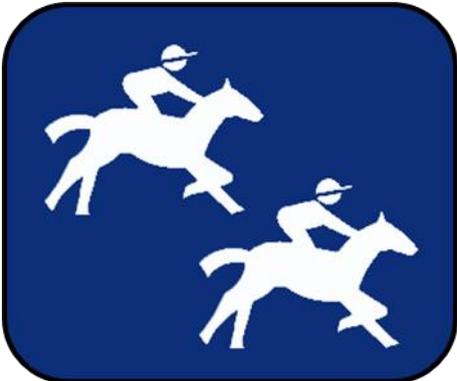
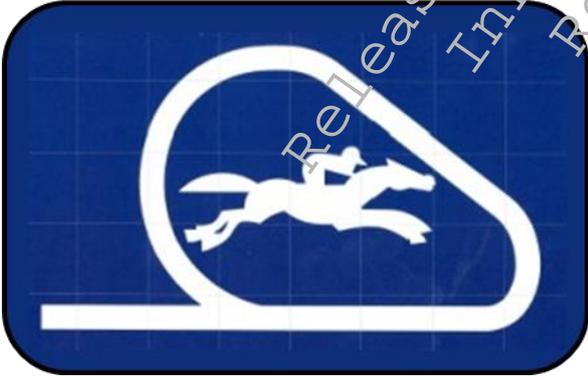
A.1.1 Playground

Design A	
	<p>Preference testing</p> <p>1st preference – 1 2nd preference – 7 3rd preference – 37</p> <p>Main comments: The symbol is not identified as specifically 'playground' related, and may be confused with other activities. A positive was the simplicity of the sign.</p>
Design B	
	<p>Preference testing</p> <p>1st preference – 22 2nd preference – 20 3rd preference – 4</p> <p>Main comments: The sign was very obvious to most participants, but some felt it was much too busy.</p>
Design C – most preferred design	
	<p>Preference testing</p> <p>1st preference – 23 2nd preference – 13 3rd preference – 4</p> <p>Main comments: The sign was very obvious to most participants and was also simple.</p> <p>Visibility testing</p> <p>Mean distance = 16.1 m Standard deviation = 6.2 m These values equate to approximately 180 m and 70 m respectively for a full size sign (assumed to be 900 mm tall/wide)</p> <p>Recognition testing</p> <p>Correct answer – 81 Almost correct answer – 9 Incorrect answer – 0</p> <p>Main comments: Sign is thought to be for a park and not specifically a playground.</p> <p>Recall testing</p> <p>Correct answer – 89 Almost correct answer – 1 Incorrect answer – 0</p> <p>Main comments: Sign is thought to be for a park and not specifically a playground.</p>

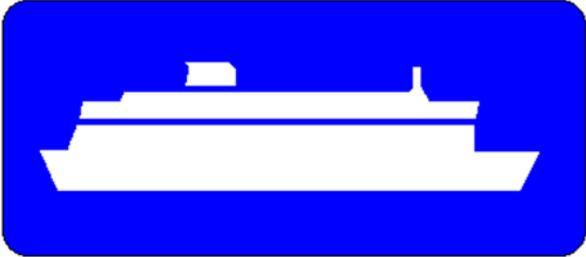
A.1.2 Port

Design A – most preferred design	
	<p>Preference testing</p> <p>1st preference – 24 2nd preference – 13 3rd preference – 9</p> <p>Main comments: The symbol shows the clearest elements of a port, without the sign being confused for something else sea-related. However some felt the sign was too busy.</p> <p>Visibility testing</p> <p>Mean distance = 14.3 m Standard deviation = 7.3 m</p> <p>These values equate to approximately 215 m and 110 m respectively for a full size sign (assumed to be 1200 mm tall/wide).</p> <p>Recognition testing</p> <p>Correct answer – 86 Almost correct answer – 3 Incorrect answer – 1</p> <p>Main comments: Sign is thought to be for an industrial area.</p> <p>Recall testing</p> <p>Correct answer – 89 Almost correct answer – 0 Incorrect answer – 1</p> <p>Main comments: Sign is thought to be for an industrial area.</p>
Design B	
	<p>Preference testing</p> <p>1st preference – 8 2nd preference – 25 3rd preference – 13</p> <p>Main comments: Most felt this sign was rather ambiguous.</p>
Design C	
	<p>Preference testing</p> <p>1st preference – 14 2nd preference – 8 3rd preference – 24</p> <p>Main comments: The symbol is not identified as specifically 'port' related, and may be confused with other sea activities. A positive was the simplicity of the sign.</p>

A.1.3 Racecourse

Design A	
	<p>Preference testing</p> <p>1st preference – 17 2nd preference – 9 3rd preference – 18</p> <p>Main comments: The symbol is not identified as specifically 'racecourse' related, and may be confused with other horse-related activities. A positive was the simplicity of the sign.</p>
Design B – most preferred design	
	<p>Preference testing</p> <p>1st preference – 2 2nd preference – 34 3rd preference – 8</p> <p>Main comments: The symbol is not identified as specifically 'racecourse' related, and may be confused with other horse-related activities. The symbol elements are also too small.</p>
Design C – most preferred design	
	<p>Preference testing</p> <p>1st preference – 26 2nd preference – 1 3rd preference – 18</p> <p>Main comments: The shape around the horse was not identified by some as a 'race track', but for others it was very obvious.</p> <p>Visibility testing</p> <p>Mean distance = 10.0 m Standard deviation = 7.7 m These values equate to approximately 150 m and 115 m respectively for a full size sign (assumed to be 1200 mm wide).</p> <p>Recognition testing</p> <p>Correct answer – 85 Almost correct answer – 1 Incorrect answer – 4 Main comments: Sign is thought to be for a horse crossing.</p> <p>Recall testing</p> <p>Correct answer – 89 Almost correct answer – 1 Incorrect answer – 0 Main comments: Sign is thought to be for a horse crossing.</p>

A.1.4 Ferry

Ferry	
	<p>Visibility testing</p> <p>Mean distance = 14.6 m Standard deviation = 5.9 m These values equate to approximately 220 m and 90 m respectively for a full size sign (assumed to be 1200 mm wide)</p> <p>Recognition testing</p> <p>Correct answer – 83 Almost correct answer – 6 Incorrect answer – 1 Main comments: Did not answer specifically (ship/port).</p> <p>Recall testing</p> <p>Correct answer – 90 Almost correct answer – 0 Incorrect answer – 0 Main comments: none.</p>

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A.2 Warning Signs

A.2.1 Cyclist dooring

Design A	
	<p>Preference testing</p> <p>1st preference – 12 2nd preference – 9 3rd preference – 27</p> <p>Main comments: Confusion over the elements, particularly the vehicle on the left.</p>
Design B – most preferred design	
	<p>Preference testing</p> <p>1st preference – 22 2nd preference – 21 3rd preference – 5</p> <p>Main comments: Accurately describes the narrative of a cyclist about to be doored.</p> <p>Visibility testing</p> <p>Mean distance = 10.5 m Standard deviation = 6.0 m</p> <p>These values equate to approximately 80 m and 45 m respectively for a full size sign (assumed to be 600 mm tall).</p> <p>Recognition testing</p> <p>Correct answer – 22 Almost correct answer – 67 Incorrect answer – 1</p> <p>Main comments: Sign is thought to be for drivers and not for cyclists.</p> <p>Recall testing</p> <p>Correct answer – 60 Almost correct answer – 29 Incorrect answer – 1</p> <p>Main comments: Sign is thought to be for drivers and not for cyclists.</p>
Design C	
	<p>Preference testing</p> <p>1st preference – 14 2nd preference – 18 3rd preference – 16</p> <p>Main comments: There is disconnection between the elements, and there is no cyclist. However the bicycle symbol is more easily recognisable.</p>

A.2.2 Deer

Deer	
	Visibility testing
	Mean distance = 17.7 m
	Standard deviation = 4.2 m
	These values equate to approximately 260 m and 60 m respectively for a full size sign (assumed to be 1200 mm long on each side)
	Recognition testing
Correct answer – 72	
Almost correct answer – 17	
Incorrect answer – 1	
Main comments: Did not answer specifically (wildlife).	
Recall testing	
Correct answer – 87	
Almost correct answer – 3	
Incorrect answer – 0	
Main comments: Did not answer specifically (wildlife).	

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A.2.3 Golf

Design A – most preferred design

**Preference testing**

1st preference – 40

2nd preference – 6

Main comments: The symbol was considered to be clearer and more expected for a golf course.

Visibility testing

Mean distance = 15.7 m

Standard deviation = 6.2 m

These values equate to approximately 175 m and 70 m respectively for a full size sign (assumed to be 900 mm long on each side).

Recognition testing

Correct answer – 69

Almost correct answer – 21

Incorrect answer – 0

Main comments: Thought sign was for directions to a nearby golf course.

Recall testing

Correct answer – 80

Almost correct answer – 10

Incorrect answer – 0

Main comments: Thought sign was for directions to a nearby golf course.

Design B

**Preference testing**

1st preference – 6

2nd preference – 40

Main comments: Most felt this sign was rather ambiguous.

Visibility testing

Mean distance = 12.0 m

Standard deviation = 7.4 m

These values equate to approximately 135 m and 85 m respectively for a full size sign (assumed to be 900 mm tall/wide).

Recognition testing

Correct answer – 88

Almost correct answer – 1

Incorrect answer – 1

Main comments: Thought sign was for a folk-lift.

Recall testing

Correct answer – 88

Almost correct answer – 0

Incorrect answer – 2

Main comments: Thought sign was for a folk-lift.

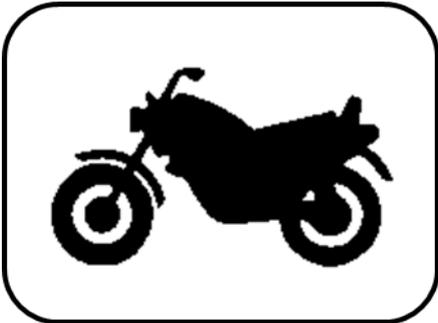
A.3 Regulatory Signs

A.3.1 Transit lane

Transit lane (T2)	
 	<p>Visibility testing</p> <p>Mean distance = 15.4 m Standard deviation = 3.5 m These values equate to approximately 125 m and 25 m respectively for a full size sign (assumed to be 600 mm high).</p> <p>Recognition testing</p> <p>Correct answer – 82 Almost correct answer – 2 Incorrect answer – 6 Main comments: Unknown sign.</p> <p>Recall testing</p> <p>Correct answer – 90 Almost correct answer – 0 Incorrect answer – 0 Main comments: None.</p>
Transit lane (T3)	
 	<p>Recognition testing</p> <p>Correct answer – 89 Almost correct answer – 0 Incorrect answer – 1 Main comments: Did not answer/understand question.</p> <p>Recall testing</p> <p>Correct answer – 90 Almost correct answer – 0 Incorrect answer – 0 Main comments: None.</p>

A.4 Symbol for Use on Other Signs

A.4.1 Motorcycle

Design A – most preferred design	
	<p>Preference testing</p> <p>1st preference – 20 2nd preference – 23 3rd preference – 5</p> <p>Main comments: The symbol shows the clearest image of a motorcycle, however some felt the motorcycle design was very old-fashioned and the rider appears to not be wearing a helmet.</p> <p>Visibility testing</p> <p>Mean distance = 15.9 m Standard deviation = 5.1 m</p> <p>These values equate to approximately 120 m and 38 m respectively for a full size sign (assumed to be 600 mm wide)</p> <p>Recognition testing</p> <p>Correct answer – 87 Almost correct answer – 1 Incorrect answer – 2</p> <p>Main comments: Did not answer/understand question.</p> <p>Recall testing</p> <p>Correct answer – 89 Almost correct answer – 0 Incorrect answer – 1</p> <p>Main comments: Did not answer/understand question.</p>
Design B	
	<p>Preference testing</p> <p>1st preference – 21 2nd preference – 18 3rd preference – 9</p> <p>Main comments: Most felt this sign was too dark and 'blobby', although the motorcycle design was more modern.</p>
Design C	
	<p>Preference testing</p> <p>1st preference – 7 2nd preference – 7 3rd preference – 34</p> <p>Main comments: Most felt that the absence of a rider would be confusing for some applications. The style of motorcycle is also not as common.</p>

A.4.2 Taxi

Design A – most preferred design	
	<p>Preference testing</p> <p>1st preference – 25 2nd preference – 20 Main comments: The text size is large and the image is clear.</p> <p>Visibility testing</p> <p>Mean distance = 15.0 m Standard deviation = 7.0 m These values equate to approximately 112 m and 50 m respectively for a full size sign (assumed to be 600 mm wide).</p> <p>Recognition testing</p> <p>Correct answer – 90 Almost correct answer – 0 Incorrect answer – 0 Main comments: None.</p> <p>Recall testing</p> <p>Correct answer – 90 Almost correct answer – 0 Incorrect answer – 0 Main comments: None.</p>
Design B	
	<p>Preference testing</p> <p>1st preference – 20 2nd preference – 25 Main comments: Some felt the text size was a little small, but others felt that this was a more familiar image of a taxi, particularly with the wording on the roof of the vehicle.</p>

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