UNIVERSITAT POLITÈCNICA DE VALÈNCIA

ETS INGENIEROS DE CAMINOS, CANALES Y PUERTOS

# Appendix A: Complete results

Evaluation and assessment of wind effects on Banafjäl bridge (Västernorrland, Sweden) during its construction.

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*Curso: 2018/2019*

*Fecha: Junio 2019*

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# Appendix A

# Complete results

In the present appendix all the results from the fluid simulations are shown. Sections A.1, A.2 and A.3 show tables with all seven aerodynamic coefficients obtained in each simulation and each situation.

The results for the single beam geometry are shown in section A.1. Note that the average values were calculated based on wind speeds between 5 $m/s$ and 10 $m/s$, as explained in section 4.1.

All the results from the second situation are shown in section A.2. Note that the aerodynamic coefficients are different in each beams, as well as in the case when both beams are joined by the bracing. In this case, the average values are based on all the data.

Regarding the third situation, when the space between beam has been isolated by steel or wooden slabs, all the results are shown in section A.3.

By last, all the coefficients are shown in a graphical way in section A.4. For the single beam simulations the results for different wind speeds are shown. However, for the rest of the situations, only the average values were plotted.

## A.1 Situation 1: Single beam

| Single beam results | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2 | 0.9 | 3 | 2.5 | 0.153 | 3.063 | 0.455 | 0.035 | 1.319 | 0.502 | 0.227 |
| | | | 5 | 0.153 | 3.064 | 0.455 | 0.050 | 1.338 | 0.499 | 0.229 |
| | | | 7.5 | 0.153 | 3.089 | 0.452 | 0.023 | 1.347 | 0.508 | 0.232 |
| | | | 10 | 0.152 | 3.047 | 0.452 | 0.043 | 1.339 | 0.498 | 0.229 |
| | | | 12.5 | 0.153 | 3.089 | 0.453 | 0.048 | 1.346 | 0.504 | 0.230 |
| | | | 15 | 0.150 | 3.005 | 0.458 | 0.023 | 1.336 | 0.494 | 0.230 |
| | | | 20 | 0.149 | 3.027 | 0.463 | 0.025 | 1.364 | 0.497 | 0.234 |
| | | | 30 | 0.149 | 3.146 | 0.471 | 0.032 | 1.421 | 0.516 | 0.242 |
| | | | Avg. | 0.152 | 3.059 | 0.454 | 0.038 | 1.341 | 0.500 | 0.230 |

| Single beam results | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2 | 0.9 | 5 | 2.5 | 0.148 | 2.811 | 0.429 | 0.036 | 1.172 | 0.624 | 0.287 |
| | | | 5 | 0.148 | 2.808 | 0.427 | 0.032 | 1.185 | 0.625 | 0.290 |
| | | | 7.5 | 0.148 | 2.810 | 0.424 | 0.000 | 1.188 | 0.632 | 0.292 |
| | | | 10 | 0.149 | 2.808 | 0.424 | 0.020 | 1.195 | 0.627 | 0.292 |
| | | | 12.5 | 0.148 | 2.804 | 0.426 | 0.034 | 1.186 | 0.623 | 0.290 |
| | | | 15 | 0.148 | 2.812 | 0.442 | 0.008 | 1.209 | 0.631 | 0.295 |
| | | | 20 | 0.145 | 2.824 | 0.447 | 0.012 | 1.234 | 0.633 | 0.300 |
| | | | 30 | 0.143 | 2.831 | 0.435 | 0.012 | 1.240 | 0.634 | 0.306 |
| | | | Avg. | 0.148 | 2.809 | 0.429 | 0.019 | 1.192 | 0.628 | 0.292 |
| 2 | 0.9 | 10 | 2.5 | 0.149 | 2.729 | 0.427 | 0.005 | 1.107 | -0.142 | 0.071 |
| | | | 5 | 0.149 | 2.718 | 0.427 | 0.009 | 1.112 | -0.142 | 0.071 |
| | | | 7.5 | 0.149 | 2.722 | 0.425 | 0.002 | 1.120 | -0.142 | 0.072 |
| | | | 10 | 0.149 | 2.712 | 0.424 | 0.001 | 1.114 | -0.142 | 0.071 |
| | | | 12.5 | 0.149 | 2.715 | 0.425 | -0.003 | 1.113 | -0.142 | 0.072 |
| | | | 15 | 0.148 | 2.718 | 0.429 | 0.006 | 1.123 | -0.142 | 0.072 |
| | | | 20 | 0.144 | 2.728 | 0.438 | 0.010 | 1.157 | -0.142 | 0.074 |
| | | | 30 | 0.140 | 2.765 | 0.438 | 0.009 | 1.185 | -0.144 | 0.076 |
| | | | Avg. | 0.149 | 2.717 | 0.426 | 0.003 | 1.116 | -0.142 | 0.072 |
| 2 | 0.9 | 120 | 2.5 | 0.145 | 2.570 | 0.417 | 0.001 | 1.020 | 0.037 | 0.009 |
| | | | 5 | 0.146 | 2.569 | 0.416 | 0.003 | 1.028 | 0.037 | 0.009 |
| | | | 7.5 | 0.145 | 2.571 | 0.417 | -0.010 | 1.037 | 0.037 | 0.009 |
| | | | 10 | 0.146 | 2.569 | 0.412 | -0.004 | 1.031 | 0.037 | 0.009 |
| | | | 12.5 | 0.145 | 2.572 | 0.415 | 0.003 | 1.035 | 0.037 | 0.009 |
| | | | 15 | 0.144 | 2.579 | 0.415 | -0.002 | 1.042 | 0.037 | 0.009 |
| | | | 20 | 0.141 | 2.601 | 0.421 | 0.010 | 1.082 | 0.038 | 0.010 |
| | | | 30 | 0.135 | 2.558 | 0.492 | -0.007 | 1.111 | 0.037 | 0.011 |
| | | | Avg. | 0.145 | 2.572 | 0.415 | -0.002 | 1.035 | 0.037 | 0.009 |
| 2.5 | 0.9 | 3 | 2.5 | 0.146 | 2.863 | 0.552 | -0.107 | 0.861 | 0.535 | 0.205 |
| | | | 5 | 0.147 | 2.881 | 0.555 | -0.103 | 0.879 | 0.537 | 0.207 |
| | | | 7.5 | 0.150 | 2.919 | 0.561 | -0.100 | 0.896 | 0.544 | 0.210 |
| | | | 10 | 0.151 | 2.947 | 0.558 | -0.105 | 0.904 | -0.549 | 0.210 |
| | | | 12.5 | 0.147 | 2.898 | 0.557 | -0.106 | 0.886 | 0.541 | 0.207 |
| | | | 15 | 0.154 | 3.013 | 0.569 | -0.090 | 0.931 | 0.559 | 0.214 |
| | | | 20 | 0.153 | 2.982 | 0.580 | -0.095 | 0.958 | 0.554 | 0.220 |
| | | | 30 | 0.138 | 2.795 | 0.578 | -0.121 | 0.869 | 0.525 | 0.212 |
| | | | Avg. | 0.150 | 2.932 | 0.560 | -0.101 | 0.899 | 0.326 | 0.210 |
| 2.5 | 0.9 | 5 | 2.5 | 0.147 | 2.875 | 0.532 | -0.071 | 0.858 | -0.530 | 0.198 |
| | | | 5 | 0.147 | 2.858 | 0.528 | -0.082 | 0.861 | -0.529 | 0.199 |
| | | | 7.5 | 0.147 | 2.868 | 0.528 | -0.059 | 0.869 | -0.527 | 0.197 |
| | | | 10 | 0.148 | 2.860 | 0.517 | -0.065 | 0.875 | -0.526 | 0.199 |
| | | | 12.5 | 0.147 | 2.860 | 0.524 | -0.084 | 0.867 | -0.530 | 0.199 |
| | | | 15 | 0.148 | 2.849 | 0.520 | -0.043 | 0.881 | -0.521 | 0.199 |
| | | | 20 | 0.144 | 2.839 | 0.544 | -0.047 | 0.886 | -0.520 | 0.202 |
| | | | 30 | 0.141 | 2.870 | 0.561 | -0.070 | 0.908 | -0.529 | 0.208 |
| | | | Avg. | 0.147 | 2.859 | 0.523 | -0.067 | 0.870 | -0.527 | 0.199 |
| 2.5 | 0.9 | 10 | 2.5 | 0.146 | 2.798 | 0.511 | -0.039 | 0.777 | -0.471 | 0.166 |
| | | | 5 | 0.146 | 2.793 | 0.510 | -0.057 | 0.784 | -0.474 | 0.168 |
| | | | 7.5 | 0.146 | 2.793 | 0.510 | -0.052 | 0.786 | -0.473 | 0.168 |
| | | | 10 | 0.147 | 2.793 | 0.504 | -0.042 | 0.797 | -0.471 | 0.169 |
| | | | 12.5 | 0.146 | 2.791 | 0.508 | -0.052 | 0.791 | -0.472 | 0.169 |
| | | | 15 | 0.146 | 2.801 | 0.508 | -0.054 | 0.808 | -0.475 | 0.172 |
| | | | 20 | 0.142 | 2.814 | 0.532 | -0.032 | 0.831 | -0.473 | 0.177 |
| | | | 30 | 0.137 | 2.845 | 0.585 | -0.085 | 0.866 | -0.487 | 0.190 |
| | | | Avg. | 0.146 | 2.794 | 0.508 | -0.052 | 0.793 | -0.473 | 0.169 |

| Single beam results | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2.5 | 0.9 | 120 | 2.5 | 0.139 | 2.621 | 0.461 | -0.010 | 0.693 | 0.031 | 0.007 |
| | | | 5 | 0.139 | 2.620 | 0.462 | -0.012 | 0.699 | 0.031 | 0.007 |
| | | | 7.5 | 0.139 | 2.614 | 0.464 | 0.000 | 0.699 | 0.030 | 0.007 |
| | | | 10 | 0.140 | 2.619 | 0.465 | -0.013 | 0.704 | 0.031 | 0.007 |
| | | | 12.5 | 0.139 | 2.621 | 0.465 | -0.012 | 0.704 | 0.031 | 0.007 |
| | | | 15 | 0.138 | 2.627 | 0.479 | -0.002 | 0.713 | 0.031 | 0.007 |
| | | | 20 | 0.134 | 2.629 | 0.506 | 0.007 | 0.732 | 0.031 | 0.007 |
| | | | 30 | 0.128 | 2.705 | 0.531 | 0.002 | 0.824 | 0.031 | 0.008 |
| | | | Avg. | 0.139 | 2.620 | 0.467 | -0.008 | 0.704 | 0.030 | 0.007 |
| 3 | 0.9 | 3 | 2.5 | 0.136 | 2.858 | 0.517 | -0.110 | 0.641 | 0.297 | 0.094 |
| | | | 5 | 0.137 | 2.859 | 0.514 | -0.118 | 0.652 | 0.298 | 0.094 |
| | | | 7.5 | 0.137 | 2.864 | 0.516 | -0.119 | 0.653 | 0.299 | 0.095 |
| | | | 10 | 0.139 | 2.817 | 0.535 | -0.147 | 0.658 | 0.297 | 0.097 |
| | | | 12.5 | 0.138 | 2.845 | 0.514 | -0.116 | 0.657 | 0.296 | 0.095 |
| | | | 15 | 0.138 | 2.797 | 0.538 | -0.156 | 0.657 | 0.295 | 0.098 |
| | | | 20 | 0.132 | 2.806 | 0.534 | -0.116 | 0.671 | 0.293 | 0.098 |
| | | | 30 | 0.130 | 2.848 | 0.529 | -0.134 | 0.663 | 0.299 | 0.097 |
| | | | Avg. | 0.138 | 2.836 | 0.523 | -0.131 | 0.655 | 0.297 | 0.096 |
| 3 | 0.9 | 5 | 2.5 | 0.143 | 2.987 | 0.538 | -0.091 | 0.669 | 0.029 | 0.007 |
| | | | 5 | 0.143 | 2.979 | 0.541 | -0.094 | 0.676 | 0.029 | 0.007 |
| | | | 7.5 | 0.143 | 2.988 | 0.540 | -0.105 | 0.681 | 0.029 | 0.007 |
| | | | 10 | 0.144 | 2.991 | 0.542 | -0.113 | 0.687 | 0.029 | 0.007 |
| | | | 12.5 | 0.143 | 2.981 | 0.538 | -0.101 | 0.679 | 0.029 | 0.007 |
| | | | 15 | 0.142 | 2.982 | 0.542 | -0.113 | 0.692 | 0.029 | 0.007 |
| | | | 20 | 0.139 | 2.956 | 0.559 | -0.069 | 0.711 | 0.029 | 0.007 |
| | | | 30 | 0.138 | 3.030 | 0.591 | -0.148 | 0.723 | 0.030 | 0.007 |
| | | | Avg. | 0.143 | 2.984 | 0.541 | -0.105 | 0.683 | 0.029 | 0.007 |
| 3 | 0.9 | 10 | 2.5 | 0.141 | 2.947 | 0.488 | -0.047 | 0.619 | 0.014 | 0.002 |
| | | | 5 | 0.142 | 2.940 | 0.490 | -0.048 | 0.625 | 0.014 | 0.002 |
| | | | 7.5 | 0.142 | 2.943 | 0.490 | -0.044 | 0.629 | 0.014 | 0.002 |
| | | | 10 | 0.142 | 2.938 | 0.492 | -0.042 | 0.628 | 0.014 | 0.002 |
| | | | 12.5 | 0.142 | 2.932 | 0.491 | -0.048 | 0.626 | 0.014 | 0.002 |
| | | | 15 | 0.141 | 2.931 | 0.501 | -0.049 | 0.631 | 0.014 | 0.002 |
| | | | 20 | 0.137 | 2.954 | 0.538 | -0.065 | 0.676 | 0.014 | 0.003 |
| | | | 30 | 0.135 | 3.024 | 0.571 | -0.091 | 0.706 | 0.014 | 0.003 |
| | | | Avg. | 0.142 | 2.937 | 0.493 | -0.046 | 0.628 | 0.014 | 0.002 |
| 3 | 0.9 | 120 | 2.5 | 0.133 | 2.703 | 0.424 | 0.009 | 0.544 | 0.026 | 0.005 |
| | | | 5 | 0.134 | 2.705 | 0.426 | 0.008 | 0.552 | 0.026 | 0.005 |
| | | | 7.5 | 0.134 | 2.709 | 0.428 | 0.000 | 0.556 | 0.026 | 0.005 |
| | | | 10 | 0.134 | 2.716 | 0.430 | 0.003 | 0.561 | 0.026 | 0.005 |
| | | | 12.5 | 0.133 | 2.702 | 0.429 | 0.009 | 0.554 | 0.026 | 0.005 |
| | | | 15 | 0.132 | 2.719 | 0.438 | 0.004 | 0.566 | 0.026 | 0.005 |
| | | | 20 | 0.127 | 2.721 | 0.454 | 0.003 | 0.580 | 0.026 | 0.005 |
| | | | 30 | 0.122 | 2.820 | 0.490 | 0.010 | 0.627 | 0.027 | 0.006 |
| | | | Avg. | 0.133 | 2.710 | 0.430 | 0.005 | 0.558 | 0.026 | 0.005 |

## A.2 Situation 2: Double beam

### A.2.1 Upwind beam

| Double beam results (upwind beam) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2 | 2 | 0.9 | 3 | 5 | 0.163 | 2.427 | 0.125 | -0.021 | 0.134 | -0.543 | 0.029 |
| | | | | 7.5 | 0.164 | 2.432 | 0.126 | -0.023 | 0.134 | -0.544 | 0.029 |
| | | | | 10 | 0.162 | 2.429 | 0.135 | -0.026 | 0.139 | -0.545 | 0.029 |
| | | | | 12.5 | 0.163 | 2.433 | 0.132 | -0.027 | 0.138 | -0.546 | 0.029 |
| | | | | 15 | 0.159 | 2.436 | 0.144 | -0.026 | 0.143 | -0.546 | 0.030 |
| | | | | Avg. | 0.162 | 2.431 | 0.132 | -0.025 | 0.137 | -0.545 | 0.029 |
| 2 | 2 | 0.9 | 5 | 5 | 0.163 | 2.429 | 0.080 | 0.004 | 0.121 | -0.538 | 0.028 |
| | | | | 7.5 | 0.163 | 2.429 | 0.080 | 0.002 | 0.121 | -0.538 | 0.028 |
| | | | | 10 | 0.160 | 2.430 | 0.084 | 0.004 | 0.120 | -0.538 | 0.028 |
| | | | | 12.5 | 0.161 | 2.431 | 0.082 | 0.006 | 0.120 | -0.538 | 0.028 |
| | | | | 15 | 0.157 | 2.433 | 0.088 | 0.007 | 0.117 | -0.538 | 0.028 |
| | | | | Avg. | 0.161 | 2.430 | 0.083 | 0.005 | 0.120 | -0.538 | 0.028 |
| 2 | 2 | 0.9 | 10 | 5 | 0.161 | 2.375 | 0.059 | -0.005 | 0.120 | -0.528 | 0.027 |
| | | | | 7.5 | 0.161 | 2.375 | 0.059 | -0.004 | 0.120 | -0.528 | 0.027 |
| | | | | 10 | 0.159 | 2.373 | 0.060 | -0.002 | 0.118 | -0.527 | 0.027 |
| | | | | 12.5 | 0.160 | 2.374 | 0.060 | -0.002 | 0.119 | -0.527 | 0.027 |
| | | | | 15 | 0.155 | 2.377 | 0.063 | 0.001 | 0.114 | -0.527 | 0.026 |
| | | | | Avg. | 0.159 | 2.375 | 0.060 | -0.002 | 0.118 | -0.527 | 0.027 |
| 2 | 2 | 0.9 | 120 | 5 | 0.159 | 2.317 | 0.052 | 0.001 | 0.119 | -0.521 | 0.029 |
| | | | | 7.5 | 0.159 | 2.318 | 0.052 | -0.001 | 0.118 | -0.522 | 0.029 |
| | | | | 10 | 0.156 | 2.318 | 0.053 | 0.001 | 0.117 | -0.521 | 0.029 |
| | | | | 12.5 | 0.158 | 2.320 | 0.053 | 0.002 | 0.117 | -0.522 | 0.029 |
| | | | | 15 | 0.153 | 2.323 | 0.055 | -0.002 | 0.113 | -0.523 | 0.028 |
| | | | | Avg. | 0.157 | 2.319 | 0.053 | -0.000 | 0.117 | -0.522 | 0.029 |
| 2 | 2.5 | 0.9 | 3 | 5 | 0.158 | 2.284 | 0.061 | -0.062 | 0.101 | -0.520 | 0.011 |
| | | | | 7.5 | 0.158 | 2.291 | 0.061 | -0.060 | 0.102 | -0.522 | 0.011 |
| | | | | 10 | 0.156 | 2.294 | 0.062 | -0.067 | 0.102 | -0.524 | 0.011 |
| | | | | 12.5 | 0.157 | 2.298 | 0.062 | -0.065 | 0.102 | -0.524 | 0.011 |
| | | | | 15 | 0.154 | 2.296 | 0.066 | -0.070 | 0.105 | -0.525 | 0.011 |
| | | | | Avg. | 0.157 | 2.293 | 0.062 | -0.065 | 0.102 | -0.523 | 0.011 |
| 2 | 2.5 | 0.9 | 5 | 5 | 0.163 | 2.318 | 0.012 | -0.022 | 0.069 | -0.519 | 0.014 |
| | | | | 7.5 | 0.163 | 2.319 | 0.012 | -0.020 | 0.069 | -0.519 | 0.014 |
| | | | | 10 | 0.160 | 2.319 | 0.014 | -0.022 | 0.069 | -0.519 | 0.013 |
| | | | | 12.5 | 0.162 | 2.320 | 0.013 | -0.023 | 0.069 | -0.520 | 0.013 |
| | | | | 15 | 0.157 | 2.321 | 0.017 | -0.023 | 0.070 | -0.520 | 0.013 |
| | | | | Avg. | 0.161 | 2.319 | 0.014 | -0.022 | 0.069 | -0.519 | 0.013 |
| 2 | 2.5 | 0.9 | 10 | 5 | 0.159 | 2.259 | 0.008 | -0.012 | 0.058 | 0.414 | 0.011 |
| | | | | 7.5 | 0.159 | 2.258 | 0.007 | -0.013 | 0.058 | 0.414 | 0.011 |
| | | | | 10 | 0.155 | 2.259 | 0.008 | -0.012 | 0.057 | 0.414 | 0.011 |
| | | | | 12.5 | 0.158 | 2.258 | 0.008 | -0.011 | 0.058 | 0.414 | 0.011 |
| | | | | 15 | 0.152 | 2.263 | 0.010 | -0.013 | 0.057 | 0.415 | 0.011 |
| | | | | Avg. | 0.157 | 2.259 | 0.008 | -0.012 | 0.058 | 0.414 | 0.011 |
| 2 | 2.5 | 0.9 | 120 | 5 | 0.156 | 2.197 | 0.006 | 0.000 | 0.055 | -0.487 | 0.012 |
| | | | | 7.5 | 0.156 | 2.198 | 0.006 | -0.000 | 0.056 | -0.487 | 0.013 |
| | | | | 10 | 0.153 | 2.199 | 0.007 | 0.001 | 0.054 | -0.488 | 0.012 |
| | | | | 12.5 | 0.155 | 2.200 | 0.007 | -0.000 | 0.055 | -0.488 | 0.012 |
| | | | | 15 | 0.149 | 2.207 | 0.009 | 0.000 | 0.054 | -0.489 | 0.012 |
| | | | | Avg. | 0.154 | 2.200 | 0.007 | 0.000 | 0.055 | -0.488 | 0.012 |
| 2 | 3 | 0.9 | 3 | 5 | 0.163 | 2.294 | 0.012 | -0.101 | 0.052 | -0.531 | 0.011 |
| | | | | 7.5 | 0.163 | 2.299 | 0.012 | -0.102 | 0.052 | -0.533 | 0.011 |
| | | | | 10 | 0.161 | 2.306 | 0.012 | -0.109 | 0.053 | -0.536 | 0.011 |
| | | | | 12.5 | 0.162 | 2.308 | 0.012 | -0.107 | 0.053 | -0.536 | 0.011 |
| | | | | 15 | 0.159 | 2.314 | 0.012 | -0.115 | 0.055 | -0.539 | 0.012 |
| | | | | Avg. | 0.162 | 2.304 | 0.012 | -0.107 | 0.053 | -0.535 | 0.011 |

| Double beam results (upwind beam) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2 | 3 | 0.9 | 5 | 5 | 0.161 | 2.257 | 0.014 | -0.033 | 0.037 | -0.508 | 0.008 |
| | | | | 7.5 | 0.161 | 2.258 | 0.014 | -0.032 | 0.037 | -0.508 | 0.008 |
| | | | | 10 | 0.158 | 2.259 | 0.015 | -0.035 | 0.037 | -0.509 | 0.008 |
| | | | | 12.5 | 0.160 | 2.259 | 0.015 | -0.034 | 0.037 | -0.509 | 0.008 |
| | | | | 15 | 0.156 | 2.262 | 0.017 | -0.037 | 0.039 | -0.510 | 0.009 |
| | | | | Avg. | 0.159 | 2.259 | 0.015 | -0.034 | 0.038 | -0.509 | 0.008 |
| 2 | 3 | 0.9 | 10 | 5 | 0.156 | 2.196 | 0.006 | -0.014 | 0.030 | -0.490 | 0.007 |
| | | | | 7.5 | 0.156 | 2.194 | 0.006 | -0.014 | 0.030 | -0.490 | 0.007 |
| | | | | 10 | 0.153 | 2.196 | 0.007 | -0.014 | 0.030 | -0.490 | 0.007 |
| | | | | 12.5 | 0.155 | 2.195 | 0.007 | -0.014 | 0.030 | -0.490 | 0.007 |
| | | | | 15 | 0.150 | 2.201 | 0.008 | -0.015 | 0.030 | -0.491 | 0.007 |
| | | | | Avg. | 0.154 | 2.196 | 0.007 | -0.014 | 0.030 | -0.490 | 0.007 |
| 2 | 3 | 0.9 | 120 | 5 | 0.153 | 2.135 | 0.003 | 0.001 | 0.028 | -0.468 | 0.006 |
| | | | | 7.5 | 0.153 | 2.135 | 0.003 | -0.000 | 0.028 | -0.468 | 0.006 |
| | | | | 10 | 0.150 | 2.138 | 0.003 | 0.000 | 0.028 | -0.468 | 0.006 |
| | | | | 12.5 | 0.152 | 2.138 | 0.003 | 0.000 | 0.028 | -0.468 | 0.006 |
| | | | | 15 | 0.146 | 2.139 | 0.021 | 0.000 | 0.028 | -0.469 | 0.008 |
| | | | | Avg. | 0.151 | 2.137 | 0.007 | 0.000 | 0.028 | -0.468 | 0.007 |
| 2.5 | 2.5 | 0.9 | 3 | 5 | 0.166 | 2.450 | 0.180 | -0.082 | 0.148 | -0.444 | 0.015 |
| | | | | 7.5 | 0.166 | 2.460 | 0.180 | -0.082 | 0.148 | -0.446 | 0.015 |
| | | | | 10 | 0.165 | 2.457 | 0.187 | -0.090 | 0.151 | -0.447 | 0.015 |
| | | | | 12.5 | 0.166 | 2.464 | 0.183 | -0.088 | 0.150 | -0.448 | 0.015 |
| | | | | 15 | 0.163 | 2.460 | 0.199 | -0.096 | 0.156 | -0.448 | 0.016 |
| | | | | Avg. | 0.165 | 2.458 | 0.186 | -0.087 | 0.150 | -0.447 | 0.015 |
| 2.5 | 2.5 | 0.9 | 5 | 5 | 0.167 | 2.534 | 0.052 | -0.017 | 0.093 | -0.453 | 0.016 |
| | | | | 7.5 | 0.167 | 2.534 | 0.052 | -0.018 | 0.093 | -0.453 | 0.016 |
| | | | | 10 | 0.164 | 2.535 | 0.056 | -0.018 | 0.095 | -0.453 | 0.016 |
| | | | | 12.5 | 0.166 | 2.536 | 0.053 | -0.018 | 0.093 | -0.453 | 0.016 |
| | | | | 15 | 0.161 | 2.540 | 0.063 | -0.013 | 0.096 | -0.453 | 0.016 |
| | | | | Avg. | 0.165 | 2.536 | 0.055 | -0.017 | 0.094 | -0.453 | 0.016 |
| 2.5 | 2.5 | 0.9 | 10 | 5 | 0.165 | 2.476 | 0.043 | -0.014 | 0.085 | -0.442 | 0.017 |
| | | | | 7.5 | 0.165 | 2.475 | 0.043 | -0.013 | 0.085 | -0.442 | 0.017 |
| | | | | 10 | 0.162 | 2.475 | 0.045 | -0.012 | 0.085 | -0.441 | 0.017 |
| | | | | 12.5 | 0.164 | 2.476 | 0.044 | -0.012 | 0.085 | -0.441 | 0.017 |
| | | | | 15 | 0.158 | 2.478 | 0.048 | -0.011 | 0.085 | -0.442 | 0.017 |
| | | | | Avg. | 0.163 | 2.476 | 0.045 | -0.012 | 0.085 | -0.442 | 0.017 |
| 2.5 | 2.5 | 0.9 | 120 | 5 | 0.162 | 2.404 | 0.041 | 0.000 | 0.081 | -0.427 | 0.016 |
| | | | | 7.5 | 0.163 | 2.406 | 0.041 | -0.001 | 0.081 | -0.427 | 0.016 |
| | | | | 10 | 0.159 | 2.405 | 0.043 | 0.002 | 0.080 | -0.427 | 0.016 |
| | | | | 12.5 | 0.161 | 2.406 | 0.043 | 0.001 | 0.080 | -0.427 | 0.016 |
| | | | | 15 | 0.155 | 2.395 | 0.067 | -0.001 | 0.077 | -0.425 | 0.018 |
| | | | | Avg. | 0.160 | 2.403 | 0.047 | 0.000 | 0.080 | -0.426 | 0.017 |
| 2.5 | 3 | 0.9 | 3 | 5 | 0.167 | 2.561 | 0.074 | -0.136 | 0.075 | -0.479 | 0.023 |
| | | | | 7.5 | 0.167 | 2.567 | 0.074 | -0.137 | 0.075 | -0.480 | 0.023 |
| | | | | 10 | 0.165 | 2.586 | 0.076 | -0.144 | 0.073 | -0.485 | 0.022 |
| | | | | 12.5 | 0.167 | 2.586 | 0.075 | -0.143 | 0.074 | -0.485 | 0.023 |
| | | | | 15 | 0.164 | 2.603 | 0.081 | -0.153 | 0.071 | -0.489 | 0.022 |
| | | | | Avg. | 0.166 | 2.580 | 0.076 | -0.143 | 0.074 | -0.483 | 0.023 |
| 2.5 | 3 | 0.9 | 5 | 5 | 0.166 | 2.441 | 0.026 | -0.028 | 0.061 | -0.089 | 0.002 |
| | | | | 7.5 | 0.166 | 2.442 | 0.025 | -0.028 | 0.060 | -0.089 | 0.002 |
| | | | | 10 | 0.161 | 2.433 | 0.038 | -0.034 | 0.066 | -0.089 | 0.002 |
| | | | | 12.5 | 0.165 | 2.442 | 0.028 | -0.030 | 0.062 | -0.089 | 0.002 |
| | | | | 15 | 0.157 | 2.429 | 0.046 | -0.038 | 0.072 | -0.089 | 0.002 |
| | | | | Avg. | 0.163 | 2.438 | 0.033 | -0.032 | 0.064 | -0.089 | 0.002 |

| Double beam results (upwind beam) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2.5 | 3 | 0.9 | 10 | 5 | 0.166 | 2.397 | 0.007 | -0.012 | 0.047 | -0.428 | 0.008 |
| | | | | 7.5 | 0.166 | 2.396 | 0.007 | -0.013 | 0.047 | -0.428 | 0.008 |
| | | | | 10 | 0.162 | 2.397 | 0.008 | -0.014 | 0.047 | -0.428 | 0.008 |
| | | | | 12.5 | 0.164 | 2.396 | 0.007 | -0.014 | 0.047 | -0.428 | 0.008 |
| | | | | 15 | 0.159 | 2.400 | 0.010 | -0.015 | 0.047 | -0.428 | 0.008 |
| | | | | Avg. | 0.163 | 2.397 | 0.008 | -0.013 | 0.047 | -0.428 | 0.008 |
| 2.5 | 3 | 0.9 | 120 | 5 | 0.162 | 2.323 | 0.005 | 0.000 | 0.044 | 0.412 | 0.008 |
| | | | | 7.5 | 0.162 | 2.323 | 0.005 | 0.001 | 0.044 | 0.412 | 0.008 |
| | | | | 10 | 0.159 | 2.326 | 0.006 | 0.000 | 0.043 | 0.413 | 0.008 |
| | | | | 12.5 | 0.161 | 2.326 | 0.006 | -0.000 | 0.043 | 0.413 | 0.008 |
| | | | | 15 | 0.155 | 2.333 | 0.008 | 0.001 | 0.043 | 0.414 | 0.008 |
| | | | | Avg. | 0.160 | 2.326 | 0.006 | 0.000 | 0.043 | 0.413 | 0.008 |
| 2.5 | 3.5 | 0.9 | 3 | 5 | 0.163 | 2.452 | 0.049 | -0.117 | 0.040 | -0.456 | 0.013 |
| | | | | 7.5 | 0.156 | 2.232 | 0.206 | -0.080 | 0.146 | -0.410 | 0.062 |
| | | | | 10 | 0.161 | 2.464 | 0.054 | -0.124 | 0.037 | -0.459 | 0.013 |
| | | | | 12.5 | 0.156 | 2.239 | 0.206 | -0.079 | 0.146 | -0.411 | 0.063 |
| | | | | 15 | 0.160 | 2.474 | 0.059 | -0.132 | 0.037 | -0.463 | 0.015 |
| | | | | Avg. | 0.159 | 2.372 | 0.115 | -0.106 | 0.081 | -0.440 | 0.033 |
| 2.5 | 3.5 | 0.9 | 5 | 5 | 0.167 | 2.403 | 0.022 | -0.054 | 0.039 | 0.440 | 0.008 |
| | | | | 7.5 | 0.167 | 2.404 | 0.022 | -0.054 | 0.039 | 0.441 | 0.008 |
| | | | | 10 | 0.164 | 2.407 | 0.022 | -0.061 | 0.040 | 0.438 | 0.008 |
| | | | | 12.5 | 0.166 | 2.407 | 0.022 | -0.058 | 0.039 | 0.437 | 0.008 |
| | | | | 15 | 0.162 | 2.409 | 0.023 | -0.066 | 0.042 | 0.439 | 0.009 |
| | | | | Avg. | 0.165 | 2.406 | 0.022 | -0.059 | 0.040 | 0.439 | 0.008 |
| 2.5 | 3.5 | 0.9 | 10 | 5 | 0.164 | 2.343 | 0.013 | -0.020 | 0.030 | 0.425 | 0.006 |
| | | | | 7.5 | 0.164 | 2.342 | 0.013 | -0.020 | 0.030 | 0.425 | 0.006 |
| | | | | 10 | 0.161 | 2.343 | 0.014 | -0.021 | 0.030 | 0.426 | 0.006 |
| | | | | 12.5 | 0.163 | 2.342 | 0.014 | -0.021 | 0.030 | 0.425 | 0.006 |
| | | | | 15 | 0.158 | 2.346 | 0.016 | -0.024 | 0.031 | 0.427 | 0.006 |
| | | | | Avg. | 0.162 | 2.343 | 0.014 | -0.021 | 0.030 | 0.426 | 0.006 |
| 2.5 | 3.5 | 0.9 | 120 | 5 | 0.161 | 2.270 | 0.006 | 0.000 | 0.027 | -0.403 | 0.005 |
| | | | | 7.5 | 0.161 | 2.270 | 0.006 | 0.000 | 0.027 | -0.403 | 0.005 |
| | | | | 10 | 0.157 | 2.273 | 0.006 | 0.000 | 0.027 | -0.403 | 0.005 |
| | | | | 12.5 | 0.160 | 2.273 | 0.006 | -0.000 | 0.027 | -0.403 | 0.005 |
| | | | | 15 | 0.153 | 2.090 | 0.229 | 0.000 | 0.021 | -0.371 | 0.041 |
| | | | | Avg. | 0.159 | 2.235 | 0.050 | 0.000 | 0.026 | -0.397 | 0.012 |
| 3 | 3 | 0.9 | 3 | 5 | 0.168 | 2.698 | 0.149 | -0.148 | 0.091 | -0.421 | 0.028 |
| | | | | 7.5 | 0.169 | 2.714 | 0.150 | -0.150 | 0.090 | -0.424 | 0.027 |
| | | | | 10 | 0.166 | 2.735 | 0.172 | -0.155 | 0.100 | 0.433 | 0.032 |
| | | | | 12.5 | 0.170 | 2.738 | 0.156 | -0.157 | 0.091 | 0.434 | 0.029 |
| | | | | 15 | 0.166 | 2.747 | 0.176 | -0.157 | 0.101 | 0.436 | 0.033 |
| | | | | Avg. | 0.168 | 2.726 | 0.161 | -0.153 | 0.095 | 0.092 | 0.030 |
| 3 | 3 | 0.9 | 5 | 5 | 0.172 | 2.612 | 0.041 | -0.024 | 0.075 | -0.390 | 0.009 |
| | | | | 7.5 | 0.171 | 2.613 | 0.041 | -0.025 | 0.075 | -0.390 | 0.009 |
| | | | | 10 | 0.169 | 2.613 | 0.050 | -0.027 | 0.080 | 0.396 | 0.009 |
| | | | | 12.5 | 0.170 | 2.614 | 0.044 | -0.025 | 0.076 | 0.396 | 0.009 |
| | | | | 15 | 0.166 | 2.617 | 0.062 | -0.026 | 0.086 | 0.396 | 0.009 |
| | | | | Avg. | 0.170 | 2.614 | 0.048 | -0.025 | 0.079 | 0.082 | 0.009 |
| 3 | 3 | 0.9 | 10 | 5 | 0.170 | 2.558 | 0.035 | -0.014 | 0.066 | -0.380 | 0.011 |
| | | | | 7.5 | 0.170 | 2.557 | 0.034 | -0.016 | 0.066 | -0.380 | 0.011 |
| | | | | 10 | 0.167 | 2.557 | 0.036 | -0.014 | 0.066 | 0.384 | 0.011 |
| | | | | 12.5 | 0.169 | 2.555 | 0.035 | -0.016 | 0.066 | 0.384 | 0.011 |
| | | | | 15 | 0.163 | 2.558 | 0.039 | -0.015 | 0.067 | 0.384 | 0.011 |
| | | | | Avg. | 0.168 | 2.557 | 0.036 | -0.015 | 0.066 | 0.078 | 0.011 |

| Double beam results (upwind beam) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 3 | 3 | 0.9 | 120 | 5 | 0.167 | 2.472 | 0.033 | -0.000 | 0.062 | 0.301 | 0.009 |
| | | | | 7.5 | 0.167 | 2.472 | 0.033 | 0.000 | 0.062 | 0.300 | 0.009 |
| | | | | 10 | 0.163 | 2.474 | 0.035 | -0.000 | 0.062 | 0.301 | 0.009 |
| | | | | 12.5 | 0.165 | 2.473 | 0.034 | 0.000 | 0.062 | 0.301 | 0.009 |
| | | | | 15 | 0.159 | 2.478 | 0.039 | 0.001 | 0.063 | 0.301 | 0.009 |
| | | | | Avg. | 0.164 | 2.474 | 0.035 | 0.000 | 0.062 | 0.301 | 0.009 |
| 3 | 3.5 | 0.9 | 3 | 5 | 0.171 | 2.631 | 0.092 | -0.143 | 0.053 | -0.410 | 0.016 |
| | | | | 7.5 | 0.171 | 2.635 | 0.093 | -0.146 | 0.053 | -0.411 | 0.016 |
| | | | | 10 | 0.169 | 2.640 | 0.105 | -0.145 | 0.057 | 0.407 | 0.018 |
| | | | | 12.5 | 0.171 | 2.651 | 0.098 | -0.148 | 0.054 | 0.409 | 0.017 |
| | | | | 15 | 0.167 | 2.642 | 0.109 | -0.149 | 0.060 | 0.408 | 0.019 |
| | | | | Avg. | 0.170 | 2.640 | 0.099 | -0.146 | 0.056 | 0.080 | 0.017 |
| 3 | 3.5 | 0.9 | 5 | 5 | 0.168 | 2.517 | 0.047 | -0.038 | 0.057 | -0.378 | 0.005 |
| | | | | 7.5 | 0.168 | 2.520 | 0.046 | -0.037 | 0.056 | -0.378 | 0.005 |
| | | | | 10 | 0.164 | 2.513 | 0.059 | -0.047 | 0.060 | 0.384 | 0.006 |
| | | | | 12.5 | 0.167 | 2.519 | 0.051 | -0.041 | 0.057 | 0.384 | 0.005 |
| | | | | 15 | 0.160 | 2.513 | 0.068 | -0.052 | 0.063 | 0.385 | 0.007 |
| | | | | Avg. | 0.165 | 2.516 | 0.054 | -0.043 | 0.058 | 0.079 | 0.005 |
| 3 | 3.5 | 0.9 | 10 | 5 | 0.170 | 2.489 | 0.012 | -0.014 | 0.040 | -0.370 | 0.006 |
| | | | | 7.5 | 0.170 | 2.488 | 0.012 | -0.015 | 0.040 | -0.370 | 0.006 |
| | | | | 10 | 0.166 | 2.487 | 0.014 | -0.015 | 0.041 | 0.375 | 0.005 |
| | | | | 12.5 | 0.168 | 2.486 | 0.013 | -0.016 | 0.040 | 0.375 | 0.006 |
| | | | | 15 | 0.162 | 2.487 | 0.017 | -0.017 | 0.043 | 0.376 | 0.005 |
| | | | | Avg. | 0.167 | 2.488 | 0.014 | -0.015 | 0.041 | 0.077 | 0.006 |
| 3 | 3.5 | 0.9 | 120 | 5 | 0.166 | 2.401 | 0.008 | 0.000 | 0.036 | -0.355 | 0.006 |
| | | | | 7.5 | 0.166 | 2.401 | 0.008 | 0.000 | 0.036 | -0.355 | 0.006 |
| | | | | 10 | 0.163 | 2.404 | 0.009 | 0.000 | 0.036 | -0.355 | 0.006 |
| | | | | 12.5 | 0.165 | 2.403 | 0.009 | 0.000 | 0.036 | -0.355 | 0.006 |
| | | | | 15 | 0.159 | 2.409 | 0.010 | 0.001 | 0.037 | -0.356 | 0.006 |
| | | | | Avg. | 0.164 | 2.403 | 0.009 | 0.000 | 0.036 | -0.355 | 0.006 |
| 3 | 4 | 0.9 | 3 | 5 | 0.163 | 2.256 | 0.278 | -0.039 | 0.121 | 0.339 | 0.059 |
| | | | | 7.5 | 0.168 | 2.518 | 0.079 | -0.116 | 0.023 | 0.390 | 0.013 |
| | | | | 10 | 0.161 | 2.259 | 0.281 | -0.035 | 0.122 | 0.339 | 0.060 |
| | | | | 12.5 | 0.163 | 2.268 | 0.281 | -0.037 | 0.121 | 0.341 | 0.060 |
| | | | | 15 | 0.161 | 2.265 | 0.287 | -0.035 | 0.125 | 0.340 | 0.061 |
| | | | | Avg. | 0.163 | 2.313 | 0.241 | -0.052 | 0.102 | 0.350 | 0.050 |
| 3 | 4 | 0.9 | 5 | 5 | 0.170 | 2.519 | 0.024 | -0.064 | 0.038 | 0.387 | 0.008 |
| | | | | 7.5 | 0.170 | 2.521 | 0.024 | -0.065 | 0.037 | 0.388 | 0.008 |
| | | | | 10 | 0.167 | 2.532 | 0.027 | -0.072 | 0.039 | 0.390 | 0.009 |
| | | | | 12.5 | 0.169 | 2.526 | 0.025 | -0.068 | 0.038 | 0.389 | 0.008 |
| | | | | 15 | 0.164 | 2.541 | 0.033 | -0.077 | 0.041 | 0.393 | 0.010 |
| | | | | Avg. | 0.168 | 2.528 | 0.027 | -0.069 | 0.039 | 0.390 | 0.009 |
| 3 | 4 | 0.9 | 10 | 5 | 0.169 | 2.440 | 0.020 | -0.024 | 0.028 | 0.370 | 0.005 |
| | | | | 7.5 | 0.169 | 2.439 | 0.019 | -0.023 | 0.028 | 0.369 | 0.005 |
| | | | | 10 | 0.166 | 2.439 | 0.022 | -0.027 | 0.029 | 0.370 | 0.005 |
| | | | | 12.5 | 0.168 | 2.438 | 0.020 | -0.025 | 0.028 | 0.369 | 0.005 |
| | | | | 15 | 0.163 | 2.439 | 0.024 | -0.030 | 0.030 | 0.370 | 0.005 |
| | | | | Avg. | 0.167 | 2.439 | 0.021 | -0.026 | 0.029 | 0.370 | 0.005 |
| 3 | 4 | 0.9 | 120 | 5 | 0.166 | 2.353 | 0.007 | 0.001 | 0.025 | 0.353 | 0.004 |
| | | | | 7.5 | 0.166 | 2.353 | 0.007 | 0.000 | 0.025 | 0.353 | 0.004 |
| | | | | 10 | 0.163 | 2.356 | 0.007 | 0.001 | 0.025 | 0.353 | 0.004 |
| | | | | 12.5 | 0.164 | 2.355 | 0.007 | 0.000 | 0.025 | 0.353 | 0.004 |
| | | | | 15 | 0.159 | 2.360 | 0.007 | 0.000 | 0.027 | 0.354 | 0.004 |
| | | | | Avg. | 0.164 | 2.356 | 0.007 | 0.001 | 0.025 | 0.353 | 0.004 |

### A.2.2 Downwind beam

| Double beam results (downwind beam) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2 | 2 | 0.9 | 3 | 5 | 0.163 | -0.555 | 0.265 | 0.150 | 0.530 | -0.159 | 0.126 |
| | | | | 7.5 | 0.164 | -0.551 | 0.267 | 0.152 | 0.534 | -0.158 | 0.126 |
| | | | | 10 | 0.162 | -0.558 | 0.269 | 0.173 | 0.540 | -0.164 | 0.125 |
| | | | | 12.5 | 0.163 | -0.550 | 0.271 | 0.168 | 0.540 | -0.162 | 0.126 |
| | | | | 15 | 0.159 | -0.562 | 0.275 | 0.170 | 0.549 | -0.165 | 0.126 |
| | | | | Avg. | 0.162 | -0.555 | 0.269 | 0.163 | 0.539 | -0.162 | 0.126 |
| 2 | 2 | 0.9 | 5 | 5 | 0.163 | -0.624 | 0.195 | 0.086 | 0.454 | -0.004 | 0.002 |
| | | | | 7.5 | 0.163 | -0.625 | 0.195 | 0.088 | 0.455 | -0.004 | 0.002 |
| | | | | 10 | 0.160 | -0.641 | 0.192 | 0.088 | 0.452 | -0.004 | 0.002 |
| | | | | 12.5 | 0.161 | -0.637 | 0.195 | 0.085 | 0.452 | -0.004 | 0.002 |
| | | | | 15 | 0.157 | -0.654 | 0.194 | 0.093 | 0.453 | -0.004 | 0.002 |
| | | | | Avg. | 0.161 | -0.636 | 0.194 | 0.088 | 0.453 | -0.004 | 0.002 |
| 2 | 2 | 0.9 | 10 | 5 | 0.161 | -0.638 | 0.134 | 0.050 | 0.405 | 0.153 | 0.095 |
| | | | | 7.5 | 0.161 | -0.639 | 0.134 | 0.048 | 0.407 | 0.152 | 0.095 |
| | | | | 10 | 0.159 | -0.650 | 0.131 | 0.053 | 0.403 | 0.156 | 0.094 |
| | | | | 12.5 | 0.160 | -0.646 | 0.134 | 0.050 | 0.407 | 0.154 | 0.095 |
| | | | | 15 | 0.155 | -0.660 | 0.135 | 0.052 | 0.407 | 0.158 | 0.094 |
| | | | | Avg. | 0.159 | -0.647 | 0.134 | 0.050 | 0.406 | 0.155 | 0.094 |
| 2 | 2 | 0.9 | 120 | 5 | 0.159 | -0.632 | 0.112 | 0.002 | 0.390 | -0.128 | 0.079 |
| | | | | 7.5 | 0.159 | -0.632 | 0.112 | -0.000 | 0.392 | -0.128 | 0.080 |
| | | | | 10 | 0.156 | -0.642 | 0.110 | -0.003 | 0.390 | -0.129 | 0.079 |
| | | | | 12.5 | 0.158 | -0.638 | 0.113 | -0.002 | 0.393 | -0.128 | 0.080 |
| | | | | 15 | 0.153 | -0.649 | 0.116 | 0.004 | 0.398 | -0.132 | 0.081 |
| | | | | Avg. | 0.157 | -0.639 | 0.112 | 0.000 | 0.393 | -0.129 | 0.080 |
| 2 | 2.5 | 0.9 | 3 | 5 | 0.158 | -0.494 | 0.348 | 0.202 | 0.464 | 0.153 | 0.131 |
| | | | | 7.5 | 0.158 | -0.504 | 0.346 | 0.209 | 0.463 | 0.157 | 0.131 |
| | | | | 10 | 0.156 | -0.515 | 0.347 | 0.218 | 0.455 | 0.161 | 0.130 |
| | | | | 12.5 | 0.157 | -0.510 | 0.350 | 0.206 | 0.460 | 0.157 | 0.131 |
| | | | | 15 | 0.154 | -0.512 | 0.361 | 0.230 | 0.457 | 0.163 | 0.133 |
| | | | | Avg. | 0.157 | -0.507 | 0.350 | 0.213 | 0.460 | 0.158 | 0.131 |
| 2 | 2.5 | 0.9 | 5 | 5 | 0.163 | -0.663 | 0.175 | 0.078 | 0.344 | 0.160 | 0.091 |
| | | | | 7.5 | 0.163 | -0.667 | 0.175 | 0.081 | 0.342 | 0.162 | 0.090 |
| | | | | 10 | 0.160 | -0.664 | 0.179 | 0.090 | 0.353 | 0.163 | 0.092 |
| | | | | 12.5 | 0.162 | -0.663 | 0.179 | 0.087 | 0.349 | 0.162 | 0.092 |
| | | | | 15 | 0.157 | -0.660 | 0.192 | 0.097 | 0.366 | 0.164 | 0.096 |
| | | | | Avg. | 0.161 | -0.664 | 0.180 | 0.087 | 0.351 | 0.162 | 0.092 |
| 2 | 2.5 | 0.9 | 10 | 5 | 0.159 | -0.681 | 0.104 | 0.037 | 0.282 | 0.157 | 0.071 |
| | | | | 7.5 | 0.159 | -0.679 | 0.104 | 0.036 | 0.282 | 0.157 | 0.071 |
| | | | | 10 | 0.155 | -0.681 | 0.105 | 0.038 | 0.291 | 0.158 | 0.073 |
| | | | | 12.5 | 0.158 | -0.680 | 0.106 | 0.036 | 0.287 | 0.157 | 0.072 |
| | | | | 15 | 0.152 | -0.683 | 0.111 | 0.042 | 0.303 | 0.159 | 0.076 |
| | | | | Avg. | 0.157 | -0.681 | 0.106 | 0.038 | 0.289 | 0.157 | 0.072 |
| 2 | 2.5 | 0.9 | 120 | 5 | 0.156 | -0.663 | 0.086 | 0.002 | 0.263 | -0.150 | 0.062 |
| | | | | 7.5 | 0.156 | -0.663 | 0.087 | -0.000 | 0.263 | -0.149 | 0.062 |
| | | | | 10 | 0.153 | -0.665 | 0.087 | 0.001 | 0.272 | -0.150 | 0.064 |
| | | | | 12.5 | 0.155 | -0.665 | 0.088 | 0.001 | 0.270 | -0.150 | 0.064 |
| | | | | 15 | 0.149 | -0.670 | 0.094 | -0.002 | 0.286 | -0.150 | 0.068 |
| | | | | Avg. | 0.154 | -0.665 | 0.088 | 0.000 | 0.271 | -0.150 | 0.064 |
| 2 | 3 | 0.9 | 3 | 5 | 0.163 | -0.677 | 0.244 | 0.201 | 0.371 | 0.193 | 0.108 |
| | | | | 7.5 | 0.163 | -0.680 | 0.244 | 0.193 | 0.372 | 0.192 | 0.108 |
| | | | | 10 | 0.161 | -0.685 | 0.246 | 0.207 | 0.375 | 0.196 | 0.109 |
| | | | | 12.5 | 0.162 | -0.685 | 0.247 | 0.198 | 0.375 | 0.194 | 0.109 |
| | | | | 15 | 0.159 | -0.686 | 0.255 | 0.218 | 0.382 | 0.199 | 0.112 |
| | | | | Avg. | 0.162 | -0.682 | 0.247 | 0.204 | 0.375 | 0.195 | 0.109 |

| Double beam results (downwind beam) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2 | 3 | 0.9 | 5 | 5 | 0.161 | -0.721 | 0.143 | 0.090 | 0.315 | 0.165 | 0.076 |
| | | | | 7.5 | 0.161 | -0.721 | 0.142 | 0.088 | 0.315 | 0.164 | 0.076 |
| | | | | 10 | 0.158 | -0.721 | 0.147 | 0.095 | 0.323 | 0.166 | 0.079 |
| | | | | 12.5 | 0.160 | -0.722 | 0.146 | 0.092 | 0.319 | 0.165 | 0.077 |
| | | | | 15 | 0.156 | -0.721 | 0.157 | 0.101 | 0.331 | 0.167 | 0.081 |
| | | | | Avg. | 0.159 | -0.721 | 0.147 | 0.094 | 0.321 | 0.165 | 0.078 |
| 2 | 3 | 0.9 | 10 | 5 | 0.156 | -0.724 | 0.080 | 0.041 | 0.268 | -0.171 | 0.066 |
| | | | | 7.5 | 0.156 | -0.722 | 0.081 | 0.037 | 0.269 | -0.170 | 0.066 |
| | | | | 10 | 0.153 | -0.725 | 0.083 | 0.042 | 0.277 | -0.172 | 0.068 |
| | | | | 12.5 | 0.155 | -0.723 | 0.083 | 0.040 | 0.274 | -0.171 | 0.067 |
| | | | | 15 | 0.150 | -0.726 | 0.091 | 0.042 | 0.290 | -0.172 | 0.072 |
| | | | | Avg. | 0.154 | -0.724 | 0.084 | 0.040 | 0.276 | -0.171 | 0.068 |
| 2 | 3 | 0.9 | 120 | 5 | 0.153 | -0.707 | 0.063 | 0.000 | 0.255 | -0.159 | 0.059 |
| | | | | 7.5 | 0.153 | -0.706 | 0.063 | 0.003 | 0.255 | -0.160 | 0.059 |
| | | | | 10 | 0.150 | -0.709 | 0.065 | 0.001 | 0.264 | -0.160 | 0.061 |
| | | | | 12.5 | 0.152 | -0.708 | 0.066 | -0.003 | 0.262 | -0.159 | 0.061 |
| | | | | 15 | 0.146 | -0.703 | 0.078 | -0.002 | 0.276 | -0.158 | 0.065 |
| | | | | Avg. | 0.151 | -0.707 | 0.067 | -0.000 | 0.262 | -0.159 | 0.061 |
| 2.5 | 2.5 | 0.9 | 3 | 5 | 0.166 | -0.311 | 0.444 | 0.221 | 0.524 | -0.096 | 0.121 |
| | | | | 7.5 | 0.166 | -0.318 | 0.447 | 0.212 | 0.530 | -0.095 | 0.121 |
| | | | | 10 | 0.165 | -0.312 | 0.458 | 0.224 | 0.535 | -0.097 | 0.124 |
| | | | | 12.5 | 0.166 | -0.311 | 0.453 | 0.222 | 0.535 | -0.096 | 0.123 |
| | | | | 15 | 0.163 | -0.301 | 0.475 | 0.232 | 0.541 | -0.096 | 0.126 |
| | | | | Avg. | 0.165 | -0.310 | 0.456 | 0.222 | 0.533 | -0.096 | 0.123 |
| 2.5 | 2.5 | 0.9 | 5 | 5 | 0.167 | -0.575 | 0.264 | 0.077 | 0.420 | -0.117 | 0.097 |
| | | | | 7.5 | 0.167 | -0.577 | 0.264 | 0.081 | 0.418 | -0.118 | 0.097 |
| | | | | 10 | 0.164 | -0.581 | 0.269 | 0.088 | 0.431 | -0.120 | 0.098 |
| | | | | 12.5 | 0.166 | -0.581 | 0.269 | 0.077 | 0.423 | -0.118 | 0.098 |
| | | | | 15 | 0.161 | -0.581 | 0.277 | 0.100 | 0.451 | -0.123 | 0.100 |
| | | | | Avg. | 0.165 | -0.579 | 0.269 | 0.084 | 0.428 | -0.119 | 0.098 |
| 2.5 | 2.5 | 0.9 | 10 | 5 | 0.165 | -0.647 | 0.185 | 0.049 | 0.341 | -0.125 | 0.076 |
| | | | | 7.5 | 0.165 | -0.651 | 0.184 | 0.046 | 0.340 | -0.125 | 0.075 |
| | | | | 10 | 0.162 | -0.655 | 0.188 | 0.047 | 0.350 | -0.126 | 0.077 |
| | | | | 12.5 | 0.164 | -0.652 | 0.188 | 0.047 | 0.344 | -0.126 | 0.076 |
| | | | | 15 | 0.158 | -0.650 | 0.200 | 0.045 | 0.366 | -0.125 | 0.080 |
| | | | | Avg. | 0.163 | -0.651 | 0.189 | 0.047 | 0.348 | -0.126 | 0.077 |
| 2.5 | 2.5 | 0.9 | 120 | 5 | 0.162 | -0.654 | 0.152 | 0.000 | 0.314 | -0.118 | 0.063 |
| | | | | 7.5 | 0.163 | -0.655 | 0.153 | -0.003 | 0.313 | -0.117 | 0.063 |
| | | | | 10 | 0.159 | -0.662 | 0.157 | -0.001 | 0.323 | -0.119 | 0.064 |
| | | | | 12.5 | 0.161 | -0.659 | 0.156 | 0.002 | 0.320 | -0.119 | 0.064 |
| | | | | 15 | 0.155 | -0.648 | 0.170 | 0.001 | 0.329 | -0.117 | 0.067 |
| | | | | Avg. | 0.160 | -0.656 | 0.158 | -0.000 | 0.320 | -0.118 | 0.064 |
| 2.5 | 3 | 0.9 | 3 | 5 | 0.167 | -0.649 | 0.338 | 0.231 | 0.424 | -0.158 | 0.115 |
| | | | | 7.5 | 0.167 | -0.659 | 0.338 | 0.228 | 0.425 | -0.160 | 0.115 |
| | | | | 10 | 0.165 | -0.677 | 0.340 | 0.225 | 0.448 | -0.162 | 0.118 |
| | | | | 12.5 | 0.167 | -0.671 | 0.342 | 0.234 | 0.436 | -0.163 | 0.117 |
| | | | | 15 | 0.164 | -0.671 | 0.348 | 0.220 | 0.478 | -0.160 | 0.124 |
| | | | | Avg. | 0.166 | -0.665 | 0.341 | 0.228 | 0.442 | -0.161 | 0.118 |
| 2.5 | 3 | 0.9 | 5 | 5 | 0.166 | -0.615 | 0.271 | 0.128 | 0.360 | 0.023 | 0.016 |
| | | | | 7.5 | 0.166 | -0.617 | 0.269 | 0.123 | 0.359 | 0.023 | 0.016 |
| | | | | 10 | 0.161 | -0.594 | 0.300 | 0.149 | 0.383 | 0.023 | 0.017 |
| | | | | 12.5 | 0.165 | -0.614 | 0.278 | 0.132 | 0.365 | 0.023 | 0.016 |
| | | | | 15 | 0.157 | -0.567 | 0.327 | 0.157 | 0.396 | 0.023 | 0.018 |
| | | | | Avg. | 0.163 | -0.602 | 0.289 | 0.138 | 0.373 | 0.023 | 0.017 |

| Double beam results (downwind beam) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2.5 | 3 | 0.9 | 10 | 5 | 0.166 | -0.711 | 0.157 | 0.046 | 0.285 | 0.003 | 0.001 |
| | | | | 7.5 | 0.166 | -0.712 | 0.157 | 0.046 | 0.283 | 0.003 | 0.001 |
| | | | | 10 | 0.162 | -0.713 | 0.163 | 0.052 | 0.298 | 0.003 | 0.001 |
| | | | | 12.5 | 0.164 | -0.711 | 0.161 | 0.048 | 0.291 | 0.003 | 0.001 |
| | | | | 15 | 0.159 | -0.708 | 0.174 | 0.060 | 0.313 | 0.003 | 0.002 |
| | | | | Avg. | 0.163 | -0.711 | 0.162 | 0.050 | 0.294 | 0.003 | 0.001 |
| 2.5 | 3 | 0.9 | 120 | 5 | 0.162 | -0.706 | 0.127 | -0.000 | 0.264 | -0.125 | 0.052 |
| | | | | 7.5 | 0.162 | -0.706 | 0.128 | 0.002 | 0.262 | -0.126 | 0.052 |
| | | | | 10 | 0.159 | -0.709 | 0.131 | 0.004 | 0.279 | -0.127 | 0.055 |
| | | | | 12.5 | 0.161 | -0.708 | 0.131 | 0.002 | 0.271 | -0.126 | 0.054 |
| | | | | 15 | 0.155 | -0.713 | 0.141 | -0.000 | 0.292 | -0.126 | 0.058 |
| | | | | Avg. | 0.160 | -0.709 | 0.132 | 0.001 | 0.274 | -0.126 | 0.054 |
| 2.5 | 3.5 | 0.9 | 3 | 5 | 0.163 | -0.684 | 0.317 | 0.191 | 0.417 | 0.158 | 0.110 |
| | | | | 7.5 | 0.156 | 0.012 | 0.365 | 0.077 | 0.614 | 0.012 | 0.146 |
| | | | | 10 | 0.161 | -0.696 | 0.317 | 0.194 | 0.441 | 0.160 | 0.112 |
| | | | | 12.5 | 0.156 | -0.001 | 0.361 | 0.068 | 0.613 | 0.012 | 0.144 |
| | | | | 15 | 0.160 | -0.674 | 0.321 | 0.192 | 0.469 | 0.156 | 0.117 |
| | | | | Avg. | 0.159 | -0.409 | 0.336 | 0.145 | 0.511 | 0.100 | 0.126 |
| 2.5 | 3.5 | 0.9 | 5 | 5 | 0.167 | -0.678 | 0.243 | 0.134 | 0.333 | -0.144 | 0.080 |
| | | | | 7.5 | 0.167 | -0.683 | 0.241 | 0.136 | 0.334 | -0.146 | 0.080 |
| | | | | 10 | 0.164 | -0.688 | 0.249 | 0.151 | 0.341 | -0.125 | 0.067 |
| | | | | 12.5 | 0.166 | -0.685 | 0.246 | 0.138 | 0.337 | -0.123 | 0.066 |
| | | | | 15 | 0.162 | -0.677 | 0.264 | 0.151 | 0.348 | -0.124 | 0.070 |
| | | | | Avg. | 0.165 | -0.682 | 0.249 | 0.142 | 0.339 | -0.132 | 0.072 |
| 2.5 | 3.5 | 0.9 | 10 | 5 | 0.164 | -0.736 | 0.147 | 0.056 | 0.289 | 0.143 | 0.062 |
| | | | | 7.5 | 0.164 | -0.737 | 0.146 | 0.058 | 0.288 | 0.143 | 0.062 |
| | | | | 10 | 0.161 | -0.740 | 0.154 | 0.061 | 0.297 | -0.144 | 0.064 |
| | | | | 12.5 | 0.163 | -0.739 | 0.151 | 0.062 | 0.292 | -0.144 | 0.063 |
| | | | | 15 | 0.158 | -0.735 | 0.166 | 0.073 | 0.309 | -0.145 | 0.068 |
| | | | | Avg. | 0.162 | -0.738 | 0.153 | 0.062 | 0.295 | -0.030 | 0.064 |
| 2.5 | 3.5 | 0.9 | 120 | 5 | 0.161 | -0.734 | 0.112 | -0.004 | 0.272 | 0.129 | 0.053 |
| | | | | 7.5 | 0.161 | -0.733 | 0.112 | 0.001 | 0.272 | 0.130 | 0.053 |
| | | | | 10 | 0.157 | -0.736 | 0.118 | -0.002 | 0.284 | 0.130 | 0.055 |
| | | | | 12.5 | 0.160 | -0.736 | 0.117 | -0.000 | 0.279 | 0.131 | 0.054 |
| | | | | 15 | 0.153 | -0.545 | 0.250 | -0.000 | 0.229 | 0.097 | 0.060 |
| | | | | Avg. | 0.159 | -0.697 | 0.142 | -0.001 | 0.267 | 0.123 | 0.055 |
| 3 | 3 | 0.9 | 3 | 5 | 0.168 | -0.555 | 0.520 | 0.341 | 0.407 | -0.134 | 0.116 |
| | | | | 7.5 | 0.169 | -0.568 | 0.517 | 0.339 | 0.411 | -0.136 | 0.115 |
| | | | | 10 | 0.166 | -0.563 | 0.534 | 0.341 | 0.432 | -0.080 | 0.070 |
| | | | | 12.5 | 0.170 | -0.576 | 0.516 | 0.338 | 0.421 | -0.081 | 0.068 |
| | | | | 15 | 0.166 | -0.575 | 0.542 | 0.342 | 0.434 | -0.081 | 0.071 |
| | | | | Avg. | 0.168 | -0.567 | 0.526 | 0.340 | 0.421 | -0.102 | 0.088 |
| 3 | 3 | 0.9 | 5 | 5 | 0.172 | -0.564 | 0.315 | 0.086 | 0.377 | 0.095 | 0.085 |
| | | | | 7.5 | 0.171 | -0.563 | 0.318 | 0.079 | 0.375 | 0.094 | 0.085 |
| | | | | 10 | 0.169 | -0.558 | 0.323 | 0.098 | 0.403 | -0.006 | 0.004 |
| | | | | 12.5 | 0.170 | -0.572 | 0.318 | 0.092 | 0.386 | -0.006 | 0.004 |
| | | | | 15 | 0.166 | -0.538 | 0.336 | 0.104 | 0.433 | -0.006 | 0.004 |
| | | | | Avg. | 0.170 | -0.559 | 0.322 | 0.092 | 0.395 | 0.034 | 0.036 |
| 3 | 3 | 0.9 | 10 | 5 | 0.170 | -0.648 | 0.219 | 0.040 | 0.305 | 0.103 | 0.065 |
| | | | | 7.5 | 0.170 | -0.651 | 0.219 | 0.046 | 0.303 | 0.105 | 0.065 |
| | | | | 10 | 0.167 | -0.654 | 0.224 | 0.052 | 0.323 | -0.085 | 0.052 |
| | | | | 12.5 | 0.169 | -0.651 | 0.223 | 0.042 | 0.312 | -0.083 | 0.052 |
| | | | | 15 | 0.163 | -0.646 | 0.235 | 0.058 | 0.339 | -0.085 | 0.055 |
| | | | | Avg. | 0.168 | -0.650 | 0.224 | 0.048 | 0.316 | -0.009 | 0.058 |

| Double beam results (downwind beam) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 3 | 3 | 0.9 | 120 | 5 | 0.167 | -0.664 | 0.175 | -0.003 | 0.279 | -0.099 | 0.049 |
| | | | | 7.5 | 0.167 | -0.666 | 0.175 | -0.000 | 0.278 | -0.100 | 0.049 |
| | | | | 10 | 0.163 | -0.671 | 0.179 | 0.002 | 0.294 | -0.101 | 0.052 |
| | | | | 12.5 | 0.165 | -0.670 | 0.179 | -0.000 | 0.287 | -0.100 | 0.051 |
| | | | | 15 | 0.159 | -0.667 | 0.191 | -0.001 | 0.321 | -0.100 | 0.056 |
| | | | | Avg. | 0.164 | -0.668 | 0.180 | -0.000 | 0.292 | -0.100 | 0.051 |
| 3 | 3.5 | 0.9 | 3 | 5 | 0.171 | -0.601 | 0.437 | 0.315 | 0.406 | 0.137 | 0.102 |
| | | | | 7.5 | 0.171 | -0.606 | 0.438 | 0.298 | 0.409 | 0.135 | 0.102 |
| | | | | 10 | 0.169 | -0.602 | 0.446 | 0.321 | 0.422 | 0.006 | 0.005 |
| | | | | 12.5 | 0.171 | -0.615 | 0.438 | 0.315 | 0.417 | 0.006 | 0.005 |
| | | | | 15 | 0.167 | -0.588 | 0.463 | 0.328 | 0.421 | 0.006 | 0.005 |
| | | | | Avg. | 0.170 | -0.602 | 0.445 | 0.315 | 0.415 | 0.058 | 0.044 |
| 3 | 3.5 | 0.9 | 5 | 5 | 0.168 | -0.542 | 0.340 | 0.149 | 0.348 | 0.104 | 0.081 |
| | | | | 7.5 | 0.168 | -0.551 | 0.337 | 0.147 | 0.348 | 0.105 | 0.081 |
| | | | | 10 | 0.164 | -0.534 | 0.365 | 0.166 | 0.363 | -0.006 | 0.004 |
| | | | | 12.5 | 0.167 | -0.546 | 0.347 | 0.155 | 0.353 | -0.006 | 0.004 |
| | | | | 15 | 0.160 | -0.524 | 0.393 | 0.176 | 0.374 | -0.006 | 0.004 |
| | | | | Avg. | 0.165 | -0.539 | 0.356 | 0.159 | 0.357 | 0.038 | 0.035 |
| 3 | 3.5 | 0.9 | 10 | 5 | 0.170 | -0.706 | 0.193 | 0.053 | 0.275 | 0.111 | 0.056 |
| | | | | 7.5 | 0.170 | -0.708 | 0.191 | 0.060 | 0.274 | 0.112 | 0.055 |
| | | | | 10 | 0.166 | -0.703 | 0.201 | 0.068 | 0.293 | -0.007 | 0.003 |
| | | | | 12.5 | 0.168 | -0.705 | 0.197 | 0.061 | 0.283 | -0.007 | 0.003 |
| | | | | 15 | 0.162 | -0.689 | 0.220 | 0.083 | 0.313 | -0.007 | 0.003 |
| | | | | Avg. | 0.167 | -0.702 | 0.200 | 0.065 | 0.288 | 0.040 | 0.024 |
| 3 | 3.5 | 0.9 | 120 | 5 | 0.166 | -0.718 | 0.148 | 0.002 | 0.252 | -0.108 | 0.044 |
| | | | | 7.5 | 0.166 | -0.720 | 0.149 | -0.001 | 0.251 | -0.107 | 0.044 |
| | | | | 10 | 0.163 | -0.723 | 0.154 | 0.003 | 0.268 | -0.108 | 0.046 |
| | | | | 12.5 | 0.165 | -0.722 | 0.152 | -0.001 | 0.260 | -0.108 | 0.045 |
| | | | | 15 | 0.159 | -0.719 | 0.165 | -0.001 | 0.290 | -0.107 | 0.050 |
| | | | | Avg. | 0.164 | -0.720 | 0.154 | 0.001 | 0.264 | -0.108 | 0.046 |
| 3 | 4 | 0.9 | 3 | 5 | 0.163 | 0.130 | 0.370 | 0.116 | 0.552 | 0.002 | 0.086 |
| | | | | 7.5 | 0.168 | -0.585 | 0.403 | 0.260 | 0.423 | -0.096 | 0.073 |
| | | | | 10 | 0.161 | 0.084 | 0.351 | 0.108 | 0.558 | -0.002 | 0.083 |
| | | | | 12.5 | 0.163 | 0.099 | 0.355 | 0.104 | 0.559 | -0.000 | 0.084 |
| | | | | 15 | 0.161 | 0.089 | 0.351 | 0.114 | 0.559 | -0.002 | 0.082 |
| | | | | Avg. | 0.163 | -0.037 | 0.366 | 0.140 | 0.530 | -0.020 | 0.081 |
| 3 | 4 | 0.9 | 5 | 5 | 0.170 | -0.661 | 0.291 | 0.152 | 0.315 | -0.122 | 0.072 |
| | | | | 7.5 | 0.170 | -0.660 | 0.290 | 0.154 | 0.315 | -0.122 | 0.072 |
| | | | | 10 | 0.167 | -0.667 | 0.298 | 0.162 | 0.327 | -0.124 | 0.075 |
| | | | | 12.5 | 0.169 | -0.670 | 0.294 | 0.152 | 0.319 | -0.123 | 0.073 |
| | | | | 15 | 0.164 | -0.665 | 0.308 | 0.163 | 0.341 | -0.124 | 0.078 |
| | | | | Avg. | 0.168 | -0.665 | 0.296 | 0.156 | 0.323 | -0.123 | 0.074 |
| 3 | 4 | 0.9 | 10 | 5 | 0.169 | -0.719 | 0.186 | 0.080 | 0.283 | -0.104 | 0.047 |
| | | | | 7.5 | 0.169 | -0.724 | 0.186 | 0.073 | 0.281 | -0.103 | 0.046 |
| | | | | 10 | 0.166 | -0.721 | 0.199 | 0.080 | 0.295 | -0.104 | 0.049 |
| | | | | 12.5 | 0.168 | -0.723 | 0.192 | 0.082 | 0.287 | -0.105 | 0.048 |
| | | | | 15 | 0.163 | -0.713 | 0.215 | 0.089 | 0.304 | -0.104 | 0.051 |
| | | | | Avg. | 0.167 | -0.720 | 0.196 | 0.081 | 0.290 | -0.104 | 0.048 |
| 3 | 4 | 0.9 | 120 | 5 | 0.166 | -0.734 | 0.134 | -0.000 | 0.266 | -0.110 | 0.045 |
| | | | | 7.5 | 0.166 | -0.735 | 0.134 | 0.001 | 0.266 | -0.110 | 0.045 |
| | | | | 10 | 0.163 | -0.739 | 0.143 | 0.001 | 0.280 | -0.111 | 0.047 |
| | | | | 12.5 | 0.164 | -0.737 | 0.139 | -0.001 | 0.274 | -0.110 | 0.046 |
| | | | | 15 | 0.159 | -0.726 | 0.159 | -0.002 | 0.298 | -0.109 | 0.051 |
| | | | | Avg. | 0.164 | -0.734 | 0.142 | -0.000 | 0.277 | -0.110 | 0.047 |

### A.2.3 Joined beams

| Double beam results (joined beams) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2 | 2 | 0.9 | 3 | 5 | 0.163 | 1.872 | 0.308 | 0.128 | 0.490 | -0.616 | 0.209 |
| | | | | 7.5 | 0.164 | 1.880 | 0.309 | 0.129 | 0.494 | -0.615 | 0.212 |
| | | | | 10 | 0.162 | 1.871 | 0.308 | 0.147 | 0.498 | -0.610 | 0.218 |
| | | | | 12.5 | 0.163 | 1.883 | 0.310 | 0.142 | 0.498 | -0.610 | 0.217 |
| | | | | 15 | 0.159 | 1.874 | 0.311 | 0.144 | 0.508 | -0.613 | 0.225 |
| | | | | Avg. | 0.162 | 1.876 | 0.309 | 0.138 | 0.497 | -0.613 | 0.216 |
| 2 | 2 | 0.9 | 5 | 5 | 0.163 | 1.805 | 0.242 | 0.090 | 0.423 | -0.500 | 0.254 |
| | | | | 7.5 | 0.163 | 1.804 | 0.242 | 0.089 | 0.422 | -0.499 | 0.254 |
| | | | | 10 | 0.160 | 1.789 | 0.239 | 0.092 | 0.423 | -0.500 | 0.252 |
| | | | | 12.5 | 0.161 | 1.795 | 0.241 | 0.090 | 0.422 | -0.502 | 0.252 |
| | | | | 15 | 0.157 | 1.779 | 0.239 | 0.100 | 0.430 | -0.499 | 0.252 |
| | | | | Avg. | 0.161 | 1.794 | 0.241 | 0.092 | 0.424 | -0.500 | 0.253 |
| 2 | 2 | 0.9 | 10 | 5 | 0.161 | 1.737 | 0.182 | 0.045 | 0.365 | -0.348 | 0.317 |
| | | | | 7.5 | 0.161 | 1.736 | 0.183 | 0.044 | 0.367 | -0.349 | 0.319 |
| | | | | 10 | 0.159 | 1.722 | 0.179 | 0.050 | 0.365 | -0.343 | 0.315 |
| | | | | 12.5 | 0.160 | 1.728 | 0.182 | 0.048 | 0.367 | -0.346 | 0.318 |
| | | | | 15 | 0.155 | 1.717 | 0.182 | 0.053 | 0.373 | -0.344 | 0.316 |
| | | | | Avg. | 0.159 | 1.728 | 0.182 | 0.048 | 0.367 | -0.346 | 0.317 |
| 2 | 2 | 0.9 | 120 | 5 | 0.159 | 1.685 | 0.160 | 0.002 | 0.348 | -0.649 | 0.138 |
| | | | | 7.5 | 0.159 | 1.686 | 0.160 | -0.001 | 0.350 | -0.649 | 0.139 |
| | | | | 10 | 0.156 | 1.676 | 0.158 | -0.002 | 0.350 | -0.652 | 0.137 |
| | | | | 12.5 | 0.158 | 1.682 | 0.161 | -0.000 | 0.352 | -0.652 | 0.139 |
| | | | | 15 | 0.153 | 1.675 | 0.164 | 0.002 | 0.360 | -0.652 | 0.139 |
| | | | | Avg. | 0.157 | 1.681 | 0.161 | 0.000 | 0.352 | -0.651 | 0.138 |
| 2 | 2.5 | 0.9 | 3 | 5 | 0.158 | 1.790 | 0.293 | 0.140 | 0.469 | -0.202 | 0.401 |
| | | | | 7.5 | 0.158 | 1.788 | 0.292 | 0.149 | 0.468 | -0.197 | 0.399 |
| | | | | 10 | 0.156 | 1.779 | 0.292 | 0.152 | 0.462 | -0.184 | 0.394 |
| | | | | 12.5 | 0.157 | 1.788 | 0.294 | 0.141 | 0.467 | -0.197 | 0.397 |
| | | | | 15 | 0.154 | 1.784 | 0.302 | 0.160 | 0.466 | -0.174 | 0.395 |
| | | | | Avg. | 0.157 | 1.786 | 0.295 | 0.148 | 0.466 | -0.191 | 0.397 |
| 2 | 2.5 | 0.9 | 5 | 5 | 0.163 | 1.655 | 0.175 | 0.056 | 0.353 | -0.296 | 0.298 |
| | | | | 7.5 | 0.163 | 1.653 | 0.175 | 0.061 | 0.352 | -0.294 | 0.296 |
| | | | | 10 | 0.160 | 1.655 | 0.179 | 0.067 | 0.361 | -0.286 | 0.307 |
| | | | | 12.5 | 0.162 | 1.656 | 0.179 | 0.064 | 0.357 | -0.289 | 0.303 |
| | | | | 15 | 0.157 | 1.660 | 0.191 | 0.075 | 0.371 | -0.281 | 0.318 |
| | | | | Avg. | 0.161 | 1.656 | 0.180 | 0.065 | 0.359 | -0.289 | 0.304 |
| 2 | 2.5 | 0.9 | 10 | 5 | 0.159 | 1.578 | 0.109 | 0.025 | 0.294 | 0.602 | 0.243 |
| | | | | 7.5 | 0.159 | 1.579 | 0.109 | 0.023 | 0.295 | 0.601 | 0.243 |
| | | | | 10 | 0.155 | 1.577 | 0.111 | 0.026 | 0.302 | 0.604 | 0.251 |
| | | | | 12.5 | 0.158 | 1.578 | 0.112 | 0.025 | 0.300 | 0.600 | 0.247 |
| | | | | 15 | 0.152 | 1.580 | 0.119 | 0.029 | 0.314 | 0.608 | 0.262 |
| | | | | Avg. | 0.157 | 1.579 | 0.112 | 0.026 | 0.301 | 0.603 | 0.249 |
| 2 | 2.5 | 0.9 | 120 | 5 | 0.156 | 1.534 | 0.092 | 0.002 | 0.276 | -0.636 | 0.106 |
| | | | | 7.5 | 0.156 | 1.534 | 0.092 | -0.000 | 0.276 | -0.637 | 0.106 |
| | | | | 10 | 0.153 | 1.534 | 0.094 | 0.002 | 0.283 | -0.637 | 0.110 |
| | | | | 12.5 | 0.155 | 1.535 | 0.095 | 0.001 | 0.282 | -0.637 | 0.109 |
| | | | | 15 | 0.149 | 1.537 | 0.103 | -0.002 | 0.297 | -0.641 | 0.116 |
| | | | | Avg. | 0.154 | 1.535 | 0.095 | 0.001 | 0.283 | -0.638 | 0.109 |
| 2 | 3 | 0.9 | 3 | 5 | 0.163 | 1.617 | 0.236 | 0.100 | 0.376 | -0.112 | 0.373 |
| | | | | 7.5 | 0.163 | 1.619 | 0.237 | 0.091 | 0.378 | -0.119 | 0.373 |
| | | | | 10 | 0.161 | 1.621 | 0.240 | 0.099 | 0.379 | -0.103 | 0.377 |
| | | | | 12.5 | 0.162 | 1.623 | 0.240 | 0.090 | 0.380 | -0.113 | 0.376 |
| | | | | 15 | 0.159 | 1.629 | 0.249 | 0.103 | 0.387 | -0.091 | 0.384 |
| | | | | Avg. | 0.162 | 1.622 | 0.240 | 0.097 | 0.380 | -0.108 | 0.376 |

| Double beam results (joined beams) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2 | 3 | 0.9 | 5 | 5 | 0.161 | 1.536 | 0.133 | 0.058 | 0.311 | -0.251 | 0.309 |
| | | | | 7.5 | 0.161 | 1.536 | 0.133 | 0.056 | 0.311 | -0.254 | 0.308 |
| | | | | 10 | 0.158 | 1.538 | 0.137 | 0.061 | 0.317 | -0.246 | 0.317 |
| | | | | 12.5 | 0.160 | 1.537 | 0.136 | 0.059 | 0.315 | -0.249 | 0.313 |
| | | | | 15 | 0.156 | 1.541 | 0.146 | 0.065 | 0.325 | -0.240 | 0.326 |
| | | | | Avg. | 0.159 | 1.538 | 0.137 | 0.060 | 0.316 | -0.248 | 0.315 |
| 2 | 3 | 0.9 | 10 | 5 | 0.156 | 1.472 | 0.076 | 0.027 | 0.263 | -0.620 | 0.143 |
| | | | | 7.5 | 0.156 | 1.472 | 0.076 | 0.023 | 0.264 | -0.622 | 0.144 |
| | | | | 10 | 0.153 | 1.471 | 0.079 | 0.028 | 0.269 | -0.620 | 0.149 |
| | | | | 12.5 | 0.155 | 1.472 | 0.079 | 0.026 | 0.268 | -0.621 | 0.147 |
| | | | | 15 | 0.150 | 1.475 | 0.086 | 0.027 | 0.281 | -0.621 | 0.156 |
| | | | | Avg. | 0.154 | 1.472 | 0.079 | 0.026 | 0.269 | -0.621 | 0.148 |
| 2 | 3 | 0.9 | 120 | 5 | 0.153 | 1.429 | 0.060 | 0.001 | 0.249 | -0.627 | 0.140 |
| | | | | 7.5 | 0.153 | 1.429 | 0.060 | 0.003 | 0.249 | -0.625 | 0.139 |
| | | | | 10 | 0.150 | 1.429 | 0.062 | 0.001 | 0.256 | -0.628 | 0.145 |
| | | | | 12.5 | 0.152 | 1.430 | 0.062 | -0.003 | 0.254 | -0.630 | 0.144 |
| | | | | 15 | 0.146 | 1.435 | 0.069 | -0.002 | 0.267 | -0.628 | 0.152 |
| | | | | Avg. | 0.151 | 1.430 | 0.063 | -0.000 | 0.255 | -0.628 | 0.144 |
| 2.5 | 2.5 | 0.9 | 3 | 5 | 0.166 | 2.139 | 0.346 | 0.139 | 0.514 | -0.388 | 0.247 |
| | | | | 7.5 | 0.166 | 2.142 | 0.349 | 0.130 | 0.518 | -0.394 | 0.250 |
| | | | | 10 | 0.165 | 2.145 | 0.349 | 0.134 | 0.530 | -0.386 | 0.252 |
| | | | | 12.5 | 0.166 | 2.154 | 0.349 | 0.134 | 0.527 | -0.389 | 0.251 |
| | | | | 15 | 0.163 | 2.159 | 0.353 | 0.136 | 0.540 | -0.380 | 0.257 |
| | | | | Avg. | 0.165 | 2.148 | 0.349 | 0.135 | 0.526 | -0.388 | 0.251 |
| 2.5 | 2.5 | 0.9 | 5 | 5 | 0.167 | 1.959 | 0.299 | 0.060 | 0.401 | -0.523 | 0.150 |
| | | | | 7.5 | 0.167 | 1.957 | 0.299 | 0.062 | 0.399 | -0.522 | 0.150 |
| | | | | 10 | 0.164 | 1.954 | 0.305 | 0.070 | 0.409 | -0.520 | 0.158 |
| | | | | 12.5 | 0.166 | 1.954 | 0.304 | 0.059 | 0.404 | -0.524 | 0.153 |
| | | | | 15 | 0.161 | 1.960 | 0.315 | 0.087 | 0.426 | -0.519 | 0.169 |
| | | | | Avg. | 0.165 | 1.957 | 0.304 | 0.068 | 0.408 | -0.522 | 0.156 |
| 2.5 | 2.5 | 0.9 | 10 | 5 | 0.165 | 1.829 | 0.217 | 0.035 | 0.333 | -0.536 | 0.117 |
| | | | | 7.5 | 0.165 | 1.825 | 0.216 | 0.034 | 0.332 | -0.537 | 0.117 |
| | | | | 10 | 0.162 | 1.820 | 0.222 | 0.035 | 0.342 | -0.538 | 0.121 |
| | | | | 12.5 | 0.164 | 1.823 | 0.220 | 0.035 | 0.337 | -0.538 | 0.118 |
| | | | | 15 | 0.158 | 1.828 | 0.235 | 0.034 | 0.359 | -0.539 | 0.127 |
| | | | | Avg. | 0.163 | 1.825 | 0.222 | 0.035 | 0.340 | -0.538 | 0.120 |
| 2.5 | 2.5 | 0.9 | 120 | 5 | 0.162 | 1.750 | 0.184 | 0.000 | 0.309 | -0.544 | 0.111 |
| | | | | 7.5 | 0.163 | 1.750 | 0.184 | -0.004 | 0.309 | -0.546 | 0.110 |
| | | | | 10 | 0.159 | 1.744 | 0.188 | 0.000 | 0.318 | -0.547 | 0.114 |
| | | | | 12.5 | 0.161 | 1.747 | 0.188 | 0.003 | 0.315 | -0.546 | 0.113 |
| | | | | 15 | 0.155 | 1.747 | 0.195 | 0.000 | 0.326 | -0.541 | 0.115 |
| | | | | Avg. | 0.160 | 1.748 | 0.188 | -0.000 | 0.316 | -0.545 | 0.113 |
| 2.5 | 3 | 0.9 | 3 | 5 | 0.167 | 1.913 | 0.351 | 0.096 | 0.427 | -0.417 | 0.163 |
| | | | | 7.5 | 0.167 | 1.908 | 0.350 | 0.092 | 0.428 | -0.421 | 0.164 |
| | | | | 10 | 0.165 | 1.909 | 0.341 | 0.081 | 0.448 | -0.425 | 0.174 |
| | | | | 12.5 | 0.167 | 1.915 | 0.346 | 0.090 | 0.437 | -0.421 | 0.168 |
| | | | | 15 | 0.164 | 1.931 | 0.338 | 0.066 | 0.475 | -0.426 | 0.187 |
| | | | | Avg. | 0.166 | 1.915 | 0.345 | 0.085 | 0.443 | -0.422 | 0.171 |
| 2.5 | 3 | 0.9 | 5 | 5 | 0.166 | 1.826 | 0.253 | 0.100 | 0.366 | 0.028 | 0.232 |
| | | | | 7.5 | 0.166 | 1.825 | 0.253 | 0.095 | 0.365 | 0.025 | 0.231 |
| | | | | 10 | 0.161 | 1.839 | 0.272 | 0.114 | 0.385 | 0.044 | 0.248 |
| | | | | 12.5 | 0.165 | 1.828 | 0.259 | 0.103 | 0.369 | 0.031 | 0.235 |
| | | | | 15 | 0.157 | 1.862 | 0.291 | 0.119 | 0.399 | 0.051 | 0.257 |
| | | | | Avg. | 0.163 | 1.836 | 0.266 | 0.106 | 0.377 | 0.036 | 0.241 |

| Double beam results (joined beams) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2.5 | 3 | 0.9 | 10 | 5 | 0.166 | 1.686 | 0.159 | 0.034 | 0.295 | -0.389 | 0.170 |
| | | | | 7.5 | 0.166 | 1.684 | 0.159 | 0.033 | 0.293 | -0.389 | 0.169 |
| | | | | 10 | 0.162 | 1.684 | 0.165 | 0.038 | 0.305 | -0.385 | 0.179 |
| | | | | 12.5 | 0.164 | 1.686 | 0.163 | 0.034 | 0.300 | -0.388 | 0.174 |
| | | | | 15 | 0.159 | 1.692 | 0.177 | 0.045 | 0.319 | -0.381 | 0.189 |
| | | | | Avg. | 0.163 | 1.686 | 0.165 | 0.037 | 0.302 | -0.386 | 0.176 |
| 2.5 | 3 | 0.9 | 120 | 5 | 0.162 | 1.617 | 0.131 | -0.000 | 0.274 | 0.287 | 0.114 |
| | | | | 7.5 | 0.162 | 1.617 | 0.132 | 0.003 | 0.273 | 0.287 | 0.113 |
| | | | | 10 | 0.159 | 1.617 | 0.137 | 0.005 | 0.286 | 0.288 | 0.122 |
| | | | | 12.5 | 0.161 | 1.617 | 0.135 | 0.002 | 0.280 | 0.288 | 0.116 |
| | | | | 15 | 0.155 | 1.619 | 0.148 | 0.001 | 0.298 | 0.286 | 0.128 |
| | | | | Avg. | 0.160 | 1.617 | 0.137 | 0.002 | 0.282 | 0.287 | 0.119 |
| 2.5 | 3.5 | 0.9 | 3 | 5 | 0.163 | 1.768 | 0.291 | 0.074 | 0.408 | -0.083 | 0.388 |
| | | | | 7.5 | 0.156 | 2.245 | 0.359 | -0.003 | 0.523 | -0.289 | 0.594 |
| | | | | 10 | 0.161 | 1.768 | 0.283 | 0.070 | 0.425 | -0.076 | 0.410 |
| | | | | 12.5 | 0.156 | 2.238 | 0.361 | -0.012 | 0.522 | -0.296 | 0.591 |
| | | | | 15 | 0.160 | 1.800 | 0.281 | 0.061 | 0.447 | -0.080 | 0.436 |
| | | | | Avg. | 0.159 | 1.964 | 0.315 | 0.038 | 0.465 | -0.165 | 0.484 |
| 2.5 | 3.5 | 0.9 | 5 | 5 | 0.167 | 1.725 | 0.233 | 0.080 | 0.331 | 0.427 | 0.187 |
| | | | | 7.5 | 0.167 | 1.721 | 0.231 | 0.082 | 0.331 | 0.428 | 0.187 |
| | | | | 10 | 0.164 | 1.719 | 0.240 | 0.090 | 0.336 | 0.462 | 0.202 |
| | | | | 12.5 | 0.166 | 1.722 | 0.237 | 0.080 | 0.334 | 0.452 | 0.200 |
| | | | | 15 | 0.162 | 1.732 | 0.257 | 0.085 | 0.343 | 0.468 | 0.208 |
| | | | | Avg. | 0.165 | 1.724 | 0.240 | 0.083 | 0.335 | 0.447 | 0.197 |
| 2.5 | 3.5 | 0.9 | 10 | 5 | 0.164 | 1.606 | 0.139 | 0.036 | 0.286 | 0.621 | 0.267 |
| | | | | 7.5 | 0.164 | 1.605 | 0.138 | 0.038 | 0.285 | 0.623 | 0.266 |
| | | | | 10 | 0.161 | 1.603 | 0.145 | 0.039 | 0.291 | 0.339 | 0.165 |
| | | | | 12.5 | 0.163 | 1.603 | 0.142 | 0.041 | 0.288 | 0.339 | 0.161 |
| | | | | 15 | 0.158 | 1.611 | 0.157 | 0.049 | 0.303 | 0.349 | 0.172 |
| | | | | Avg. | 0.162 | 1.606 | 0.144 | 0.041 | 0.291 | 0.454 | 0.206 |
| 2.5 | 3.5 | 0.9 | 120 | 5 | 0.161 | 1.536 | 0.107 | -0.004 | 0.267 | -0.276 | 0.244 |
| | | | | 7.5 | 0.161 | 1.536 | 0.107 | 0.001 | 0.267 | -0.272 | 0.244 |
| | | | | 10 | 0.157 | 1.537 | 0.113 | -0.001 | 0.277 | -0.274 | 0.256 |
| | | | | 12.5 | 0.160 | 1.536 | 0.111 | -0.000 | 0.273 | -0.273 | 0.251 |
| | | | | 15 | 0.153 | 1.546 | 0.097 | 0.000 | 0.223 | -0.274 | 0.206 |
| | | | | Avg. | 0.159 | 1.538 | 0.107 | -0.001 | 0.262 | -0.274 | 0.240 |
| 3 | 3 | 0.9 | 3 | 5 | 0.168 | 2.143 | 0.520 | 0.193 | 0.424 | -0.311 | 0.136 |
| | | | | 7.5 | 0.169 | 2.146 | 0.515 | 0.189 | 0.427 | -0.315 | 0.136 |
| | | | | 10 | 0.166 | 2.171 | 0.544 | 0.186 | 0.449 | 0.602 | 0.213 |
| | | | | 12.5 | 0.170 | 2.162 | 0.516 | 0.182 | 0.437 | 0.601 | 0.203 |
| | | | | 15 | 0.166 | 2.172 | 0.552 | 0.185 | 0.452 | 0.604 | 0.214 |
| | | | | Avg. | 0.168 | 2.159 | 0.529 | 0.187 | 0.438 | 0.236 | 0.180 |
| 3 | 3 | 0.9 | 5 | 5 | 0.172 | 2.049 | 0.325 | 0.062 | 0.372 | -0.239 | 0.268 |
| | | | | 7.5 | 0.171 | 2.050 | 0.327 | 0.054 | 0.370 | -0.245 | 0.267 |
| | | | | 10 | 0.169 | 2.055 | 0.334 | 0.071 | 0.392 | 0.453 | 0.215 |
| | | | | 12.5 | 0.170 | 2.042 | 0.327 | 0.068 | 0.379 | 0.448 | 0.205 |
| | | | | 15 | 0.166 | 2.078 | 0.344 | 0.079 | 0.415 | 0.456 | 0.233 |
| | | | | Avg. | 0.170 | 2.055 | 0.331 | 0.066 | 0.386 | 0.174 | 0.238 |
| 3 | 3 | 0.9 | 10 | 5 | 0.170 | 1.910 | 0.237 | 0.026 | 0.310 | -0.250 | 0.211 |
| | | | | 7.5 | 0.170 | 1.906 | 0.237 | 0.030 | 0.309 | -0.245 | 0.211 |
| | | | | 10 | 0.167 | 1.902 | 0.243 | 0.038 | 0.327 | 0.332 | 0.132 |
| | | | | 12.5 | 0.169 | 1.904 | 0.241 | 0.026 | 0.317 | 0.329 | 0.127 |
| | | | | 15 | 0.163 | 1.912 | 0.256 | 0.044 | 0.342 | 0.336 | 0.139 |
| | | | | Avg. | 0.168 | 1.907 | 0.243 | 0.033 | 0.321 | 0.101 | 0.164 |

| Double beam results (joined beams) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 3 | 3 | 0.9 | 120 | 5 | 0.167 | 1.808 | 0.196 | -0.003 | 0.287 | 0.200 | 0.108 |
| | | | | 7.5 | 0.167 | 1.805 | 0.196 | -0.000 | 0.286 | 0.200 | 0.108 |
| | | | | 10 | 0.163 | 1.803 | 0.201 | 0.002 | 0.301 | 0.201 | 0.113 |
| | | | | 12.5 | 0.165 | 1.804 | 0.200 | 0.000 | 0.294 | 0.200 | 0.111 |
| | | | | 15 | 0.159 | 1.811 | 0.216 | -0.000 | 0.325 | 0.200 | 0.124 |
| | | | | Avg. | 0.164 | 1.806 | 0.202 | -0.000 | 0.299 | 0.200 | 0.113 |
| 3 | 3.5 | 0.9 | 3 | 5 | 0.171 | 2.030 | 0.441 | 0.171 | 0.418 | -0.006 | 0.305 |
| | | | | 7.5 | 0.171 | 2.030 | 0.444 | 0.152 | 0.421 | -0.017 | 0.307 |
| | | | | 10 | 0.169 | 2.038 | 0.458 | 0.176 | 0.434 | 0.684 | 0.261 |
| | | | | 12.5 | 0.171 | 2.036 | 0.447 | 0.166 | 0.428 | 0.684 | 0.256 |
| | | | | 15 | 0.167 | 2.054 | 0.482 | 0.179 | 0.437 | 0.692 | 0.258 |
| | | | | Avg. | 0.170 | 2.038 | 0.454 | 0.169 | 0.428 | 0.407 | 0.278 |
| 3 | 3.5 | 0.9 | 5 | 5 | 0.168 | 1.975 | 0.301 | 0.110 | 0.355 | -0.165 | 0.264 |
| | | | | 7.5 | 0.168 | 1.969 | 0.299 | 0.110 | 0.356 | -0.166 | 0.264 |
| | | | | 10 | 0.164 | 1.980 | 0.318 | 0.119 | 0.370 | 0.502 | 0.217 |
| | | | | 12.5 | 0.167 | 1.973 | 0.306 | 0.114 | 0.359 | 0.492 | 0.210 |
| | | | | 15 | 0.160 | 1.988 | 0.342 | 0.124 | 0.379 | 0.512 | 0.226 |
| | | | | Avg. | 0.165 | 1.977 | 0.313 | 0.116 | 0.364 | 0.235 | 0.236 |
| 3 | 3.5 | 0.9 | 10 | 5 | 0.170 | 1.783 | 0.190 | 0.039 | 0.284 | -0.220 | 0.207 |
| | | | | 7.5 | 0.170 | 1.780 | 0.189 | 0.045 | 0.283 | -0.214 | 0.206 |
| | | | | 10 | 0.166 | 1.784 | 0.198 | 0.053 | 0.299 | 0.417 | 0.171 |
| | | | | 12.5 | 0.168 | 1.781 | 0.195 | 0.046 | 0.291 | 0.413 | 0.164 |
| | | | | 15 | 0.162 | 1.799 | 0.216 | 0.066 | 0.316 | 0.426 | 0.185 |
| | | | | Avg. | 0.167 | 1.785 | 0.198 | 0.050 | 0.294 | 0.164 | 0.187 |
| 3 | 3.5 | 0.9 | 120 | 5 | 0.166 | 1.683 | 0.151 | 0.003 | 0.262 | -0.462 | 0.110 |
| | | | | 7.5 | 0.166 | 1.681 | 0.151 | -0.000 | 0.261 | -0.463 | 0.109 |
| | | | | 10 | 0.163 | 1.681 | 0.158 | 0.003 | 0.275 | -0.462 | 0.118 |
| | | | | 12.5 | 0.165 | 1.681 | 0.156 | -0.000 | 0.268 | -0.463 | 0.113 |
| | | | | 15 | 0.159 | 1.690 | 0.171 | -0.000 | 0.294 | -0.464 | 0.128 |
| | | | | Avg. | 0.164 | 1.683 | 0.157 | 0.001 | 0.272 | -0.463 | 0.116 |
| 3 | 4 | 0.9 | 3 | 5 | 0.163 | 2.386 | 0.453 | 0.077 | 0.466 | 0.444 | 0.413 |
| | | | | 7.5 | 0.168 | 1.933 | 0.391 | 0.143 | 0.416 | 0.544 | 0.249 |
| | | | | 10 | 0.161 | 2.343 | 0.458 | 0.073 | 0.472 | 0.432 | 0.420 |
| | | | | 12.5 | 0.163 | 2.366 | 0.458 | 0.067 | 0.474 | 0.435 | 0.420 |
| | | | | 15 | 0.161 | 2.353 | 0.467 | 0.079 | 0.473 | 0.437 | 0.423 |
| | | | | Avg. | 0.163 | 2.276 | 0.445 | 0.088 | 0.460 | 0.458 | 0.385 |
| 3 | 4 | 0.9 | 5 | 5 | 0.170 | 1.858 | 0.294 | 0.088 | 0.313 | 0.409 | 0.173 |
| | | | | 7.5 | 0.170 | 1.861 | 0.293 | 0.089 | 0.313 | 0.412 | 0.172 |
| | | | | 10 | 0.167 | 1.864 | 0.305 | 0.090 | 0.323 | 0.422 | 0.181 |
| | | | | 12.5 | 0.169 | 1.856 | 0.299 | 0.084 | 0.317 | 0.412 | 0.176 |
| | | | | 15 | 0.164 | 1.876 | 0.318 | 0.086 | 0.337 | 0.428 | 0.189 |
| | | | | Avg. | 0.168 | 1.863 | 0.302 | 0.087 | 0.320 | 0.417 | 0.178 |
| 3 | 4 | 0.9 | 10 | 5 | 0.169 | 1.721 | 0.176 | 0.056 | 0.281 | 0.335 | 0.159 |
| | | | | 7.5 | 0.169 | 1.715 | 0.176 | 0.050 | 0.279 | 0.329 | 0.158 |
| | | | | 10 | 0.166 | 1.718 | 0.189 | 0.053 | 0.291 | 0.338 | 0.167 |
| | | | | 12.5 | 0.168 | 1.714 | 0.182 | 0.057 | 0.285 | 0.336 | 0.162 |
| | | | | 15 | 0.163 | 1.725 | 0.204 | 0.060 | 0.299 | 0.346 | 0.174 |
| | | | | Avg. | 0.167 | 1.719 | 0.185 | 0.055 | 0.287 | 0.337 | 0.164 |
| 3 | 4 | 0.9 | 120 | 5 | 0.166 | 1.620 | 0.128 | 0.000 | 0.263 | 0.242 | 0.143 |
| | | | | 7.5 | 0.166 | 1.618 | 0.128 | 0.002 | 0.263 | 0.243 | 0.143 |
| | | | | 10 | 0.163 | 1.617 | 0.137 | 0.002 | 0.275 | 0.242 | 0.153 |
| | | | | 12.5 | 0.164 | 1.618 | 0.134 | -0.000 | 0.270 | 0.242 | 0.148 |
| | | | | 15 | 0.159 | 1.634 | 0.152 | -0.002 | 0.292 | 0.243 | 0.163 |
| | | | | Avg. | 0.164 | 1.621 | 0.136 | 0.000 | 0.272 | 0.243 | 0.150 |

## A.3 Situation 3: Closed section

| Closed section results | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2 | 2 | 0.9 | 3 | 5 | 0.105 | 1.816 | 0.071 | -0.341 | 1.422 | 1.558 | 1.017 |
| | | | | 7.5 | 0.105 | 1.821 | 0.072 | -0.334 | 1.437 | 1.556 | 1.028 |
| | | | | 10 | 0.104 | 1.823 | 0.077 | -0.358 | 1.507 | 1.575 | 1.078 |
| | | | | 12.5 | 0.104 | 1.828 | 0.076 | -0.332 | 1.487 | 1.560 | 1.062 |
| | | | | 15 | 0.102 | 1.831 | 0.083 | -0.302 | 1.583 | 1.540 | 1.133 |
| | | | | Avg. | 0.104 | 1.824 | 0.076 | -0.333 | 1.487 | 1.558 | 1.064 |
| 2 | 2 | 0.9 | 5 | 5 | 0.102 | 1.817 | 0.037 | -0.189 | 1.192 | 1.454 | 0.849 |
| | | | | 7.5 | 0.102 | 1.816 | 0.039 | -0.199 | 1.202 | 1.461 | 0.855 |
| | | | | 10 | 0.098 | 1.810 | 0.051 | -0.215 | 1.310 | 1.468 | 0.930 |
| | | | | 12.5 | 0.100 | 1.816 | 0.043 | -0.185 | 1.236 | 1.451 | 0.878 |
| | | | | 15 | 0.095 | 1.811 | 0.059 | -0.199 | 1.370 | 1.458 | 0.972 |
| | | | | Avg. | 0.099 | 1.814 | 0.046 | -0.197 | 1.262 | 1.458 | 0.897 |
| 2 | 2 | 0.9 | 10 | 5 | 0.103 | 1.773 | 0.016 | -0.078 | 0.837 | 1.342 | 0.602 |
| | | | | 7.5 | 0.103 | 1.773 | 0.016 | -0.065 | 0.844 | 1.333 | 0.607 |
| | | | | 10 | 0.100 | 1.774 | 0.017 | -0.065 | 0.925 | 1.333 | 0.664 |
| | | | | 12.5 | 0.101 | 1.774 | 0.017 | -0.048 | 0.894 | 1.321 | 0.642 |
| | | | | 15 | 0.097 | 1.779 | 0.020 | -0.063 | 1.027 | 1.335 | 0.737 |
| | | | | Avg. | 0.101 | 1.775 | 0.017 | -0.064 | 0.906 | 1.333 | 0.650 |
| 2 | 2 | 0.9 | 120 | 5 | 0.102 | 1.714 | 0.012 | -0.009 | 0.745 | 1.249 | 0.540 |
| | | | | 7.5 | 0.102 | 1.715 | 0.012 | -0.004 | 0.749 | 1.246 | 0.543 |
| | | | | 10 | 0.099 | 1.717 | 0.013 | -0.003 | 0.831 | 1.248 | 0.603 |
| | | | | 12.5 | 0.100 | 1.718 | 0.013 | 0.002 | 0.801 | 1.245 | 0.581 |
| | | | | 15 | 0.096 | 1.727 | 0.016 | 0.012 | 0.941 | 1.243 | 0.682 |
| | | | | Avg. | 0.100 | 1.718 | 0.013 | -0.000 | 0.813 | 1.246 | 0.590 |
| 2 | 2.5 | 0.9 | 3 | 5 | 0.093 | 1.749 | 0.049 | -0.386 | 1.517 | 1.809 | 1.284 |
| | | | | 7.5 | 0.092 | 1.755 | 0.051 | -0.329 | 1.543 | 1.765 | 1.307 |
| | | | | 10 | 0.090 | 1.754 | 0.055 | -0.348 | 1.612 | 1.781 | 1.369 |
| | | | | 12.5 | 0.091 | 1.761 | 0.054 | -0.337 | 1.587 | 1.777 | 1.346 |
| | | | | 15 | 0.088 | 1.757 | 0.064 | -0.281 | 1.715 | 1.726 | 1.466 |
| | | | | Avg. | 0.091 | 1.755 | 0.054 | -0.336 | 1.595 | 1.772 | 1.354 |
| 2 | 2.5 | 0.9 | 5 | 5 | 0.087 | 1.720 | 0.038 | -0.188 | 1.230 | 1.622 | 1.027 |
| | | | | 7.5 | 0.087 | 1.720 | 0.040 | -0.213 | 1.244 | 1.642 | 1.038 |
| | | | | 10 | 0.082 | 1.709 | 0.054 | -0.266 | 1.388 | 1.679 | 1.157 |
| | | | | 12.5 | 0.086 | 1.717 | 0.045 | -0.247 | 1.282 | 1.670 | 1.067 |
| | | | | 15 | 0.082 | 1.713 | 0.058 | -0.205 | 1.417 | 1.630 | 1.181 |
| | | | | Avg. | 0.085 | 1.716 | 0.047 | -0.224 | 1.312 | 1.649 | 1.094 |
| 2 | 2.5 | 0.9 | 10 | 5 | 0.088 | 1.674 | 0.011 | -0.072 | 0.761 | 1.483 | 0.639 |
| | | | | 7.5 | 0.088 | 1.674 | 0.012 | -0.087 | 0.774 | 1.496 | 0.650 |
| | | | | 10 | 0.086 | 1.674 | 0.013 | -0.085 | 0.847 | 1.495 | 0.711 |
| | | | | 12.5 | 0.087 | 1.675 | 0.012 | -0.088 | 0.819 | 1.498 | 0.688 |
| | | | | 15 | 0.083 | 1.678 | 0.014 | -0.089 | 0.966 | 1.502 | 0.811 |
| | | | | Avg. | 0.086 | 1.675 | 0.012 | -0.084 | 0.833 | 1.495 | 0.700 |
| 2 | 2.5 | 0.9 | 120 | 5 | 0.088 | 1.608 | 0.003 | -0.016 | 0.623 | 1.381 | 0.529 |
| | | | | 7.5 | 0.088 | 1.609 | 0.003 | -0.004 | 0.637 | 1.371 | 0.541 |
| | | | | 10 | 0.085 | 1.612 | 0.003 | -0.004 | 0.711 | 1.374 | 0.604 |
| | | | | 12.5 | 0.087 | 1.613 | 0.003 | -0.003 | 0.684 | 1.374 | 0.581 |
| | | | | 15 | 0.083 | 1.620 | 0.005 | 0.005 | 0.812 | 1.373 | 0.691 |
| | | | | Avg. | 0.086 | 1.613 | 0.003 | -0.005 | 0.693 | 1.374 | 0.589 |
| 2 | 3 | 0.9 | 3 | 5 | 0.083 | 1.678 | 0.035 | -0.524 | 1.309 | 2.141 | 1.268 |
| | | | | 7.5 | 0.083 | 1.682 | 0.035 | -0.498 | 1.333 | 2.119 | 1.292 |
| | | | | 10 | 0.082 | 1.685 | 0.036 | -0.470 | 1.407 | 2.096 | 1.368 |
| | | | | 12.5 | 0.082 | 1.688 | 0.035 | -0.454 | 1.383 | 2.082 | 1.343 |
| | | | | 15 | 0.079 | 1.692 | 0.044 | -0.401 | 1.560 | 2.034 | 1.530 |
| | | | | Avg. | 0.082 | 1.685 | 0.037 | -0.469 | 1.398 | 2.094 | 1.360 |

| Closed section results | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2 | 3 | 0.9 | 5 | 5 | 0.076 | 1.646 | 0.037 | -0.276 | 1.204 | 1.874 | 1.154 |
| | | | | 7.5 | 0.076 | 1.646 | 0.038 | -0.274 | 1.222 | 1.872 | 1.172 |
| | | | | 10 | 0.073 | 1.639 | 0.049 | -0.318 | 1.320 | 1.908 | 1.265 |
| | | | | 12.5 | 0.075 | 1.645 | 0.042 | -0.282 | 1.253 | 1.879 | 1.201 |
| | | | | 15 | 0.071 | 1.640 | 0.058 | -0.262 | 1.400 | 1.855 | 1.341 |
| | | | | Avg. | 0.074 | 1.643 | 0.045 | -0.282 | 1.280 | 1.878 | 1.226 |
| 2 | 3 | 0.9 | 10 | 5 | 0.076 | 1.594 | 0.012 | -0.120 | 0.664 | 1.670 | 0.637 |
| | | | | 7.5 | 0.076 | 1.594 | 0.012 | -0.131 | 0.681 | 1.682 | 0.654 |
| | | | | 10 | 0.074 | 1.595 | 0.014 | -0.108 | 0.776 | 1.661 | 0.745 |
| | | | | 12.5 | 0.075 | 1.596 | 0.014 | -0.121 | 0.743 | 1.674 | 0.713 |
| | | | | 15 | 0.071 | 1.600 | 0.017 | -0.107 | 0.930 | 1.664 | 0.893 |
| | | | | Avg. | 0.074 | 1.596 | 0.014 | -0.117 | 0.759 | 1.670 | 0.729 |
| 2 | 3 | 0.9 | 120 | 5 | 0.076 | 1.520 | 0.002 | -0.006 | 0.440 | 1.488 | 0.429 |
| | | | | 7.5 | 0.076 | 1.520 | 0.003 | 0.012 | 0.444 | 1.471 | 0.433 |
| | | | | 10 | 0.073 | 1.528 | 0.003 | 0.011 | 0.574 | 1.479 | 0.560 |
| | | | | 12.5 | 0.075 | 1.528 | 0.002 | 0.002 | 0.543 | 1.488 | 0.530 |
| | | | | 15 | 0.071 | 1.540 | 0.004 | -0.006 | 0.747 | 1.507 | 0.729 |
| | | | | Avg. | 0.074 | 1.527 | 0.003 | 0.003 | 0.550 | 1.487 | 0.536 |
| 2.5 | 2.5 | 0.9 | 3 | 5 | 0.116 | 1.932 | 0.067 | -0.357 | 1.558 | 1.556 | 1.070 |
| | | | | 7.5 | 0.116 | 1.940 | 0.066 | -0.419 | 1.564 | 1.604 | 1.073 |
| | | | | 10 | 0.115 | 1.945 | 0.064 | -0.354 | 1.618 | 1.563 | 1.110 |
| | | | | 12.5 | 0.116 | 1.950 | 0.064 | -0.409 | 1.600 | 1.604 | 1.095 |
| | | | | 15 | 0.113 | 1.957 | 0.068 | -0.417 | 1.692 | 1.615 | 1.162 |
| | | | | Avg. | 0.115 | 1.945 | 0.066 | -0.391 | 1.606 | 1.589 | 1.102 |
| 2.5 | 2.5 | 0.9 | 5 | 5 | 0.108 | 1.919 | 0.055 | -0.280 | 1.364 | 1.495 | 0.911 |
| | | | | 7.5 | 0.108 | 1.921 | 0.055 | -0.240 | 1.364 | 1.470 | 0.910 |
| | | | | 10 | 0.106 | 1.918 | 0.059 | -0.268 | 1.414 | 1.486 | 0.942 |
| | | | | 12.5 | 0.107 | 1.922 | 0.058 | -0.283 | 1.393 | 1.499 | 0.928 |
| | | | | 15 | 0.104 | 1.918 | 0.069 | -0.279 | 1.486 | 1.494 | 0.989 |
| | | | | Avg. | 0.107 | 1.919 | 0.059 | -0.270 | 1.405 | 1.489 | 0.936 |
| 2.5 | 2.5 | 0.9 | 10 | 5 | 0.110 | 1.891 | 0.027 | -0.068 | 1.009 | 1.332 | 0.681 |
| | | | | 7.5 | 0.110 | 1.892 | 0.027 | -0.081 | 1.011 | 1.341 | 0.683 |
| | | | | 10 | 0.107 | 1.889 | 0.027 | -0.090 | 1.074 | 1.346 | 0.724 |
| | | | | 12.5 | 0.109 | 1.891 | 0.027 | -0.062 | 1.033 | 1.328 | 0.697 |
| | | | | 15 | 0.104 | 1.893 | 0.028 | -0.095 | 1.145 | 1.352 | 0.772 |
| | | | | Avg. | 0.108 | 1.891 | 0.027 | -0.079 | 1.055 | 1.340 | 0.711 |
| 2.5 | 2.5 | 0.9 | 120 | 5 | 0.109 | 1.818 | 0.026 | -0.006 | 0.881 | 1.240 | 0.599 |
| | | | | 7.5 | 0.109 | 1.818 | 0.026 | -0.022 | 0.879 | 1.252 | 0.598 |
| | | | | 10 | 0.106 | 1.819 | 0.026 | -0.006 | 0.945 | 1.241 | 0.643 |
| | | | | 12.5 | 0.107 | 1.820 | 0.026 | 0.007 | 0.908 | 1.233 | 0.618 |
| | | | | 15 | 0.103 | 1.829 | 0.027 | -0.001 | 1.023 | 1.244 | 0.696 |
| | | | | Avg. | 0.107 | 1.821 | 0.026 | -0.006 | 0.927 | 1.242 | 0.631 |
| 2.5 | 3 | 0.9 | 3 | 5 | 0.106 | 1.864 | 0.046 | -0.436 | 1.543 | 1.794 | 1.216 |
| | | | | 7.5 | 0.106 | 1.871 | 0.047 | -0.430 | 1.548 | 1.795 | 1.220 |
| | | | | 10 | 0.105 | 1.873 | 0.047 | -0.463 | 1.578 | 1.822 | 1.242 |
| | | | | 12.5 | 0.106 | 1.880 | 0.047 | -0.436 | 1.575 | 1.806 | 1.239 |
| | | | | 15 | 0.103 | 1.881 | 0.052 | -0.428 | 1.673 | 1.801 | 1.320 |
| | | | | Avg. | 0.105 | 1.874 | 0.048 | -0.439 | 1.584 | 1.804 | 1.247 |
| 2.5 | 3 | 0.9 | 5 | 5 | 0.096 | 1.830 | 0.049 | -0.328 | 1.401 | 1.683 | 1.074 |
| | | | | 7.5 | 0.097 | 1.832 | 0.050 | -0.277 | 1.398 | 1.646 | 1.072 |
| | | | | 10 | 0.095 | 1.828 | 0.053 | -0.286 | 1.448 | 1.649 | 1.109 |
| | | | | 12.5 | 0.096 | 1.832 | 0.053 | -0.315 | 1.426 | 1.675 | 1.092 |
| | | | | 15 | 0.093 | 1.828 | 0.061 | -0.324 | 1.517 | 1.679 | 1.162 |
| | | | | Avg. | 0.095 | 1.830 | 0.053 | -0.306 | 1.438 | 1.666 | 1.102 |

| Closed section results | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 2.5 | 3 | 0.9 | 10 | 5 | 0.097 | 1.796 | 0.016 | -0.095 | 0.962 | 1.474 | 0.743 |
| | | | | 7.5 | 0.097 | 1.795 | 0.016 | -0.102 | 0.959 | 1.480 | 0.740 |
| | | | | 10 | 0.095 | 1.793 | 0.016 | -0.111 | 1.026 | 1.485 | 0.792 |
| | | | | 12.5 | 0.096 | 1.796 | 0.016 | -0.083 | 0.990 | 1.466 | 0.764 |
| | | | | 15 | 0.093 | 1.797 | 0.017 | -0.095 | 1.115 | 1.476 | 0.860 |
| | | | | Avg. | 0.096 | 1.795 | 0.016 | -0.097 | 1.011 | 1.476 | 0.780 |
| 2.5 | 3 | 0.9 | 120 | 5 | 0.097 | 1.717 | 0.012 | 0.010 | 0.775 | 1.331 | 0.604 |
| | | | | 7.5 | 0.097 | 1.718 | 0.012 | -0.001 | 0.775 | 1.340 | 0.604 |
| | | | | 10 | 0.094 | 1.720 | 0.012 | -0.008 | 0.850 | 1.347 | 0.663 |
| | | | | 12.5 | 0.096 | 1.720 | 0.012 | -0.005 | 0.804 | 1.346 | 0.627 |
| | | | | 15 | 0.092 | 1.729 | 0.013 | 0.025 | 0.945 | 1.329 | 0.737 |
| | | | | Avg. | 0.095 | 1.721 | 0.012 | 0.004 | 0.830 | 1.339 | 0.647 |
| 2.5 | 3.5 | 0.9 | 3 | 5 | 0.098 | 1.799 | 0.031 | -0.580 | 1.352 | 2.094 | 1.196 |
| | | | | 7.5 | 0.098 | 1.803 | 0.031 | -0.578 | 1.360 | 2.096 | 1.202 |
| | | | | 10 | 0.097 | 1.805 | 0.031 | -0.587 | 1.385 | 2.105 | 1.223 |
| | | | | 12.5 | 0.098 | 1.808 | 0.031 | -0.559 | 1.370 | 2.083 | 1.210 |
| | | | | 15 | 0.095 | 1.811 | 0.034 | -0.545 | 1.486 | 2.074 | 1.316 |
| | | | | Avg. | 0.097 | 1.805 | 0.032 | -0.570 | 1.391 | 2.090 | 1.229 |
| 2.5 | 3.5 | 0.9 | 5 | 5 | 0.086 | 1.763 | 0.047 | -0.318 | 1.460 | 1.831 | 1.268 |
| | | | | 7.5 | 0.086 | 1.765 | 0.048 | -0.305 | 1.460 | 1.822 | 1.268 |
| | | | | 10 | 0.085 | 1.761 | 0.050 | -0.287 | 1.502 | 1.802 | 1.304 |
| | | | | 12.5 | 0.086 | 1.765 | 0.050 | -0.291 | 1.484 | 1.810 | 1.288 |
| | | | | 15 | 0.083 | 1.760 | 0.059 | -0.332 | 1.582 | 1.841 | 1.373 |
| | | | | Avg. | 0.085 | 1.763 | 0.051 | -0.307 | 1.498 | 1.821 | 1.300 |
| 2.5 | 3.5 | 0.9 | 10 | 5 | 0.086 | 1.719 | 0.016 | -0.118 | 0.952 | 1.617 | 0.826 |
| | | | | 7.5 | 0.086 | 1.720 | 0.016 | -0.104 | 0.950 | 1.604 | 0.824 |
| | | | | 10 | 0.084 | 1.717 | 0.016 | -0.158 | 1.030 | 1.650 | 0.895 |
| | | | | 12.5 | 0.085 | 1.719 | 0.016 | -0.134 | 0.988 | 1.631 | 0.858 |
| | | | | 15 | 0.081 | 1.720 | 0.018 | -0.099 | 1.137 | 1.601 | 0.988 |
| | | | | Avg. | 0.084 | 1.719 | 0.016 | -0.123 | 1.011 | 1.621 | 0.878 |
| 2.5 | 3.5 | 0.9 | 120 | 5 | 0.086 | 1.637 | 0.005 | 0.003 | 0.697 | 1.437 | 0.613 |
| | | | | 7.5 | 0.086 | 1.637 | 0.005 | 0.015 | 0.690 | 1.427 | 0.607 |
| | | | | 10 | 0.084 | 1.640 | 0.005 | -0.014 | 0.779 | 1.456 | 0.685 |
| | | | | 12.5 | 0.085 | 1.641 | 0.005 | -0.019 | 0.730 | 1.460 | 0.642 |
| | | | | 15 | 0.082 | 1.650 | 0.006 | 0.021 | 0.895 | 1.433 | 0.788 |
| | | | | Avg. | 0.085 | 1.641 | 0.005 | 0.001 | 0.758 | 1.443 | 0.667 |
| 3 | 3 | 0.9 | 3 | 5 | 0.124 | 2.040 | 0.103 | -0.376 | 1.667 | 1.544 | 1.118 |
| | | | | 7.5 | 0.125 | 2.050 | 0.100 | -0.385 | 1.679 | 1.556 | 1.123 |
| | | | | 10 | 0.123 | 2.059 | 0.098 | -0.428 | 1.733 | 1.589 | 1.157 |
| | | | | 12.5 | 0.125 | 2.062 | 0.096 | -0.383 | 1.712 | 1.562 | 1.141 |
| | | | | 15 | 0.122 | 2.065 | 0.104 | -0.327 | 1.789 | 1.528 | 1.195 |
| | | | | Avg. | 0.124 | 2.055 | 0.100 | -0.380 | 1.716 | 1.556 | 1.147 |
| 3 | 3 | 0.9 | 5 | 5 | 0.114 | 2.003 | 0.072 | -0.301 | 1.476 | 1.498 | 0.947 |
| | | | | 7.5 | 0.114 | 2.006 | 0.074 | -0.331 | 1.487 | 1.519 | 0.953 |
| | | | | 10 | 0.112 | 2.001 | 0.073 | -0.321 | 1.541 | 1.510 | 0.986 |
| | | | | 12.5 | 0.114 | 2.006 | 0.074 | -0.317 | 1.495 | 1.510 | 0.957 |
| | | | | 15 | 0.110 | 2.002 | 0.080 | -0.337 | 1.574 | 1.520 | 1.007 |
| | | | | Avg. | 0.113 | 2.004 | 0.075 | -0.321 | 1.515 | 1.511 | 0.970 |
| 3 | 3 | 0.9 | 10 | 5 | 0.115 | 1.985 | 0.038 | -0.116 | 1.143 | 1.197 | 0.636 |
| | | | | 7.5 | 0.115 | 1.985 | 0.038 | -0.129 | 1.140 | 1.204 | 0.635 |
| | | | | 10 | 0.112 | 1.981 | 0.036 | -0.115 | 1.187 | 1.194 | 0.659 |
| | | | | 12.5 | 0.114 | 1.985 | 0.038 | -0.093 | 1.160 | 1.183 | 0.645 |
| | | | | 15 | 0.110 | 1.985 | 0.036 | -0.103 | 1.243 | 1.189 | 0.690 |
| | | | | Avg. | 0.113 | 1.984 | 0.037 | -0.111 | 1.174 | 1.193 | 0.653 |

| Closed section results | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $h\,(m)$ | $d\,(m)$ | $b\,(m)$ | $H\,(m)$ | $U\,(m/s)$ | $St$ | $C_D$ | $RMS_{C_D}$ | $C_L$ | $RMS_{C_L}$ | $C_M$ | $RMS_{C_M}$ |
| 3 | 3 | 0.9 | 120 | 5 | 0.113 | 1.901 | 0.039 | -0.009 | 0.998 | 1.240 | 0.650 |
| | | | | 7.5 | 0.113 | 1.901 | 0.039 | 0.032 | 0.991 | 1.214 | 0.644 |
| | | | | 10 | 0.111 | 1.900 | 0.037 | -0.001 | 1.035 | 1.234 | 0.673 |
| | | | | 12.5 | 0.113 | 1.902 | 0.038 | -0.001 | 1.010 | 1.236 | 0.657 |
| | | | | 15 | 0.109 | 1.909 | 0.037 | 0.005 | 1.095 | 1.236 | 0.712 |
| | | | | Avg. | 0.112 | 1.903 | 0.038 | 0.005 | 1.026 | 1.232 | 0.667 |
| 3 | 3.5 | 0.9 | 3 | 5 | 0.117 | 1.959 | 0.063 | -0.502 | 1.550 | 1.778 | 1.162 |
| | | | | 7.5 | 0.117 | 1.967 | 0.063 | -0.494 | 1.563 | 1.777 | 1.170 |
| | | | | 10 | 0.116 | 1.966 | 0.060 | -0.445 | 1.579 | 1.742 | 1.179 |
| | | | | 12.5 | 0.117 | 1.978 | 0.060 | -0.526 | 1.567 | 1.809 | 1.170 |
| | | | | 15 | 0.115 | 1.976 | 0.062 | -0.476 | 1.626 | 1.771 | 1.213 |
| | | | | Avg. | 0.116 | 1.969 | 0.062 | -0.489 | 1.577 | 1.775 | 1.179 |
| 3 | 3.5 | 0.9 | 5 | 5 | 0.105 | 1.922 | 0.054 | -0.351 | 1.496 | 1.666 | 1.083 |
| | | | | 7.5 | 0.105 | 1.924 | 0.056 | -0.349 | 1.506 | 1.667 | 1.090 |
| | | | | 10 | 0.103 | 1.918 | 0.058 | -0.381 | 1.548 | 1.686 | 1.118 |
| | | | | 12.5 | 0.104 | 1.924 | 0.058 | -0.367 | 1.518 | 1.680 | 1.097 |
| | | | | 15 | 0.101 | 1.917 | 0.064 | -0.378 | 1.601 | 1.683 | 1.156 |
| | | | | Avg. | 0.104 | 1.921 | 0.058 | -0.365 | 1.534 | 1.677 | 1.109 |
| 3 | 3.5 | 0.9 | 10 | 5 | 0.104 | 1.893 | 0.023 | -0.105 | 1.097 | 1.305 | 0.699 |
| | | | | 7.5 | 0.104 | 1.894 | 0.024 | -0.101 | 1.099 | 1.302 | 0.700 |
| | | | | 10 | 0.102 | 1.889 | 0.022 | -0.166 | 1.146 | 1.342 | 0.730 |
| | | | | 12.5 | 0.103 | 1.893 | 0.023 | -0.138 | 1.120 | 1.326 | 0.713 |
| | | | | 15 | 0.099 | 1.892 | 0.024 | -0.130 | 1.228 | 1.320 | 0.782 |
| | | | | Avg. | 0.102 | 1.892 | 0.023 | -0.128 | 1.138 | 1.319 | 0.725 |
| 3 | 3.5 | 0.9 | 120 | 5 | 0.104 | 1.802 | 0.021 | -0.003 | 0.872 | 1.323 | 0.640 |
| | | | | 7.5 | 0.104 | 1.802 | 0.021 | 0.023 | 0.867 | 1.304 | 0.635 |
| | | | | 10 | 0.102 | 1.803 | 0.021 | 0.029 | 0.916 | 1.300 | 0.672 |
| | | | | 12.5 | 0.103 | 1.804 | 0.021 | 0.022 | 0.882 | 1.305 | 0.647 |
| | | | | 15 | 0.099 | 1.813 | 0.022 | 0.003 | 1.008 | 1.326 | 0.740 |
| | | | | Avg. | 0.102 | 1.805 | 0.021 | 0.015 | 0.909 | 1.312 | 0.667 |
| 3 | 4 | 0.9 | 3 | 5 | 0.111 | 1.892 | 0.040 | -0.624 | 1.312 | 2.028 | 1.086 |
| | | | | 7.5 | 0.111 | 1.896 | 0.040 | -0.596 | 1.310 | 2.008 | 1.084 |
| | | | | 10 | 0.110 | 1.897 | 0.037 | -0.614 | 1.335 | 2.023 | 1.101 |
| | | | | 12.5 | 0.111 | 1.903 | 0.037 | -0.598 | 1.304 | 2.015 | 1.077 |
| | | | | 15 | 0.109 | 1.905 | 0.038 | -0.609 | 1.365 | 2.026 | 1.125 |
| | | | | Avg. | 0.110 | 1.899 | 0.038 | -0.608 | 1.325 | 2.020 | 1.095 |
| 3 | 4 | 0.9 | 5 | 5 | 0.096 | 1.861 | 0.048 | -0.355 | 1.578 | 1.809 | 1.278 |
| | | | | 7.5 | 0.096 | 1.862 | 0.049 | -0.414 | 1.573 | 1.859 | 1.273 |
| | | | | 10 | 0.095 | 1.860 | 0.049 | -0.312 | 1.631 | 1.774 | 1.322 |
| | | | | 12.5 | 0.096 | 1.866 | 0.050 | -0.322 | 1.601 | 1.787 | 1.296 |
| | | | | 15 | 0.093 | 1.855 | 0.055 | -0.390 | 1.696 | 1.833 | 1.372 |
| | | | | Avg. | 0.095 | 1.861 | 0.050 | -0.358 | 1.616 | 1.812 | 1.308 |
| 3 | 4 | 0.9 | 10 | 5 | 0.093 | 1.818 | 0.019 | -0.188 | 1.112 | 1.476 | 0.799 |
| | | | | 7.5 | 0.093 | 1.817 | 0.020 | -0.167 | 1.108 | 1.461 | 0.795 |
| | | | | 10 | 0.091 | 1.815 | 0.020 | -0.136 | 1.174 | 1.436 | 0.843 |
| | | | | 12.5 | 0.093 | 1.817 | 0.020 | -0.170 | 1.128 | 1.463 | 0.810 |
| | | | | 15 | 0.089 | 1.814 | 0.024 | -0.201 | 1.275 | 1.483 | 0.915 |
| | | | | Avg. | 0.092 | 1.816 | 0.021 | -0.173 | 1.160 | 1.464 | 0.832 |
| 3 | 4 | 0.9 | 120 | 5 | 0.094 | 1.722 | 0.011 | -0.026 | 0.786 | 1.427 | 0.643 |
| | | | | 7.5 | 0.094 | 1.722 | 0.011 | 0.016 | 0.785 | 1.392 | 0.641 |
| | | | | 10 | 0.092 | 1.725 | 0.012 | -0.004 | 0.857 | 1.410 | 0.700 |
| | | | | 12.5 | 0.093 | 1.725 | 0.012 | 0.015 | 0.815 | 1.396 | 0.666 |
| | | | | 15 | 0.090 | 1.720 | 0.040 | 0.013 | 0.931 | 1.393 | 0.762 |
| | | | | Avg. | 0.093 | 1.723 | 0.017 | 0.003 | 0.835 | 1.404 | 0.682 |

## A.4 Graphical representations

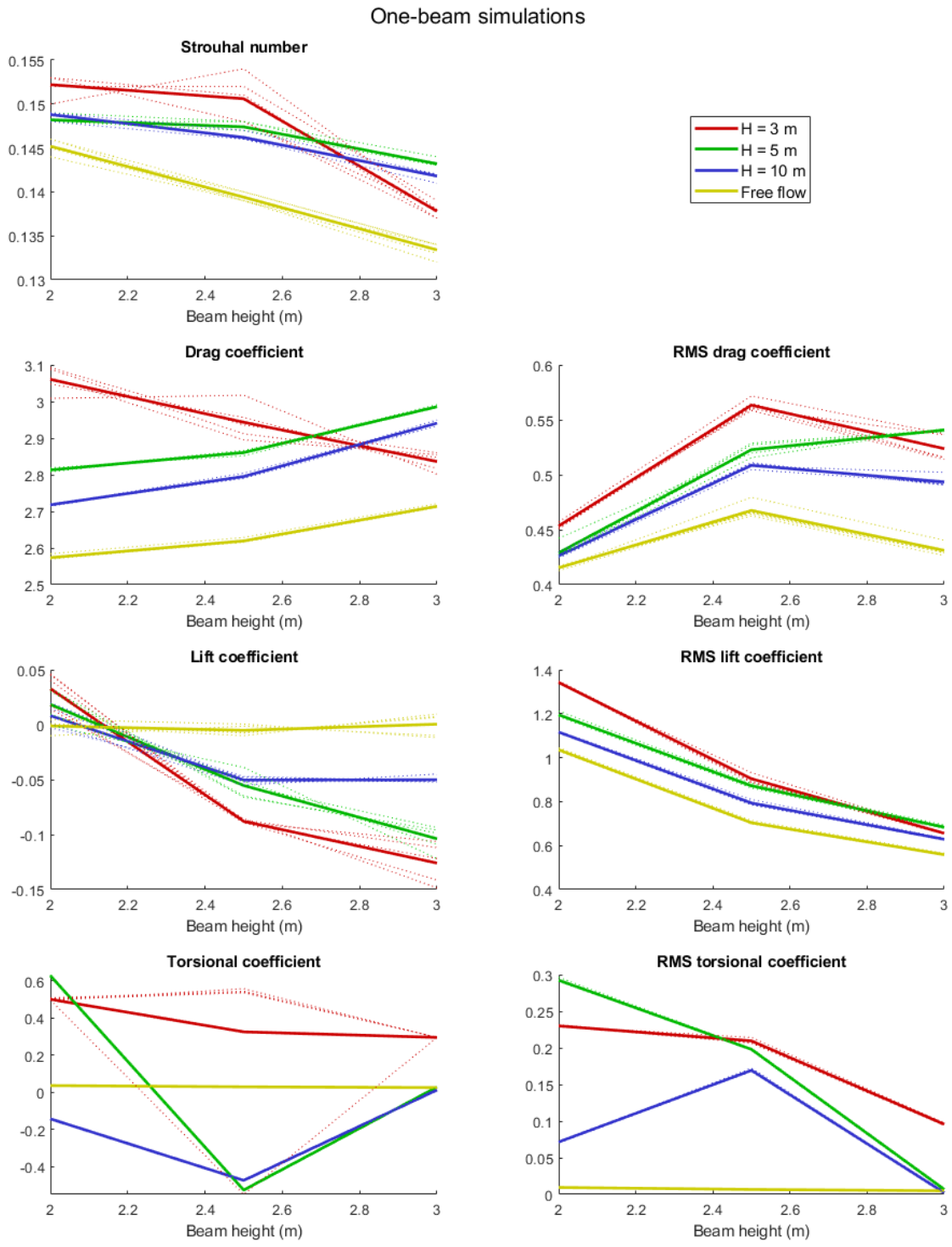


**Figure A.1:** Graphical representation of the aerodynamic coefficients obtained in the single beam situation depending on the height of the beam. Each color represents a different height of the bridge. The dotted lines are the results for a particular wind speeds, while the continuous lines are the average values.

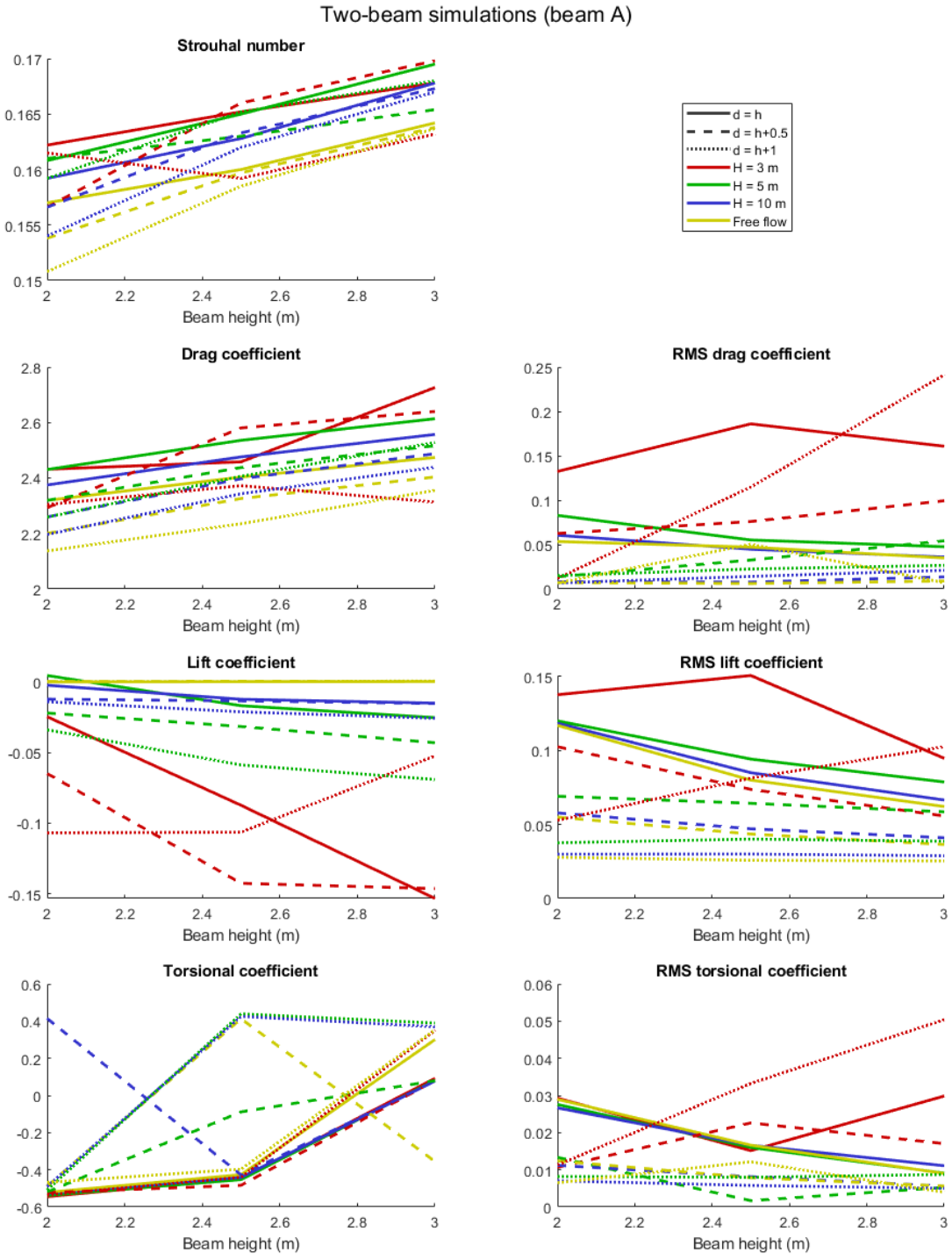


**Figure A.2:** Graphical representation of the average coefficients obtained for the upwind beam in the second situation. Each color represents a different height of the bridge, while the style of the line represents the distance between beams.

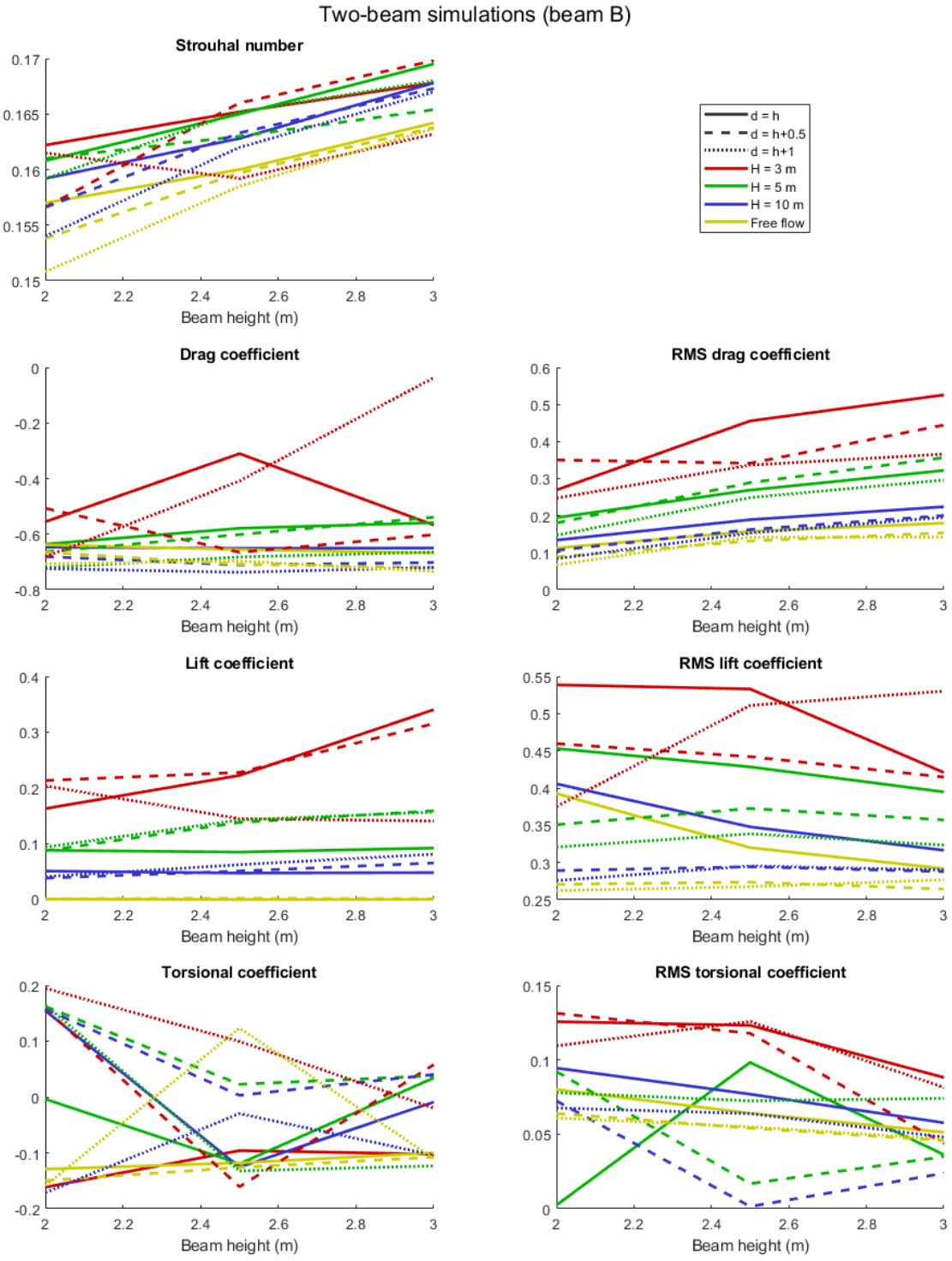


**Figure A.3:** Graphical representation of the average coefficients obtained for the downwind beam in the second situation. Each color represents a different height of the bridge, while the style of the line represents the distance between beams.

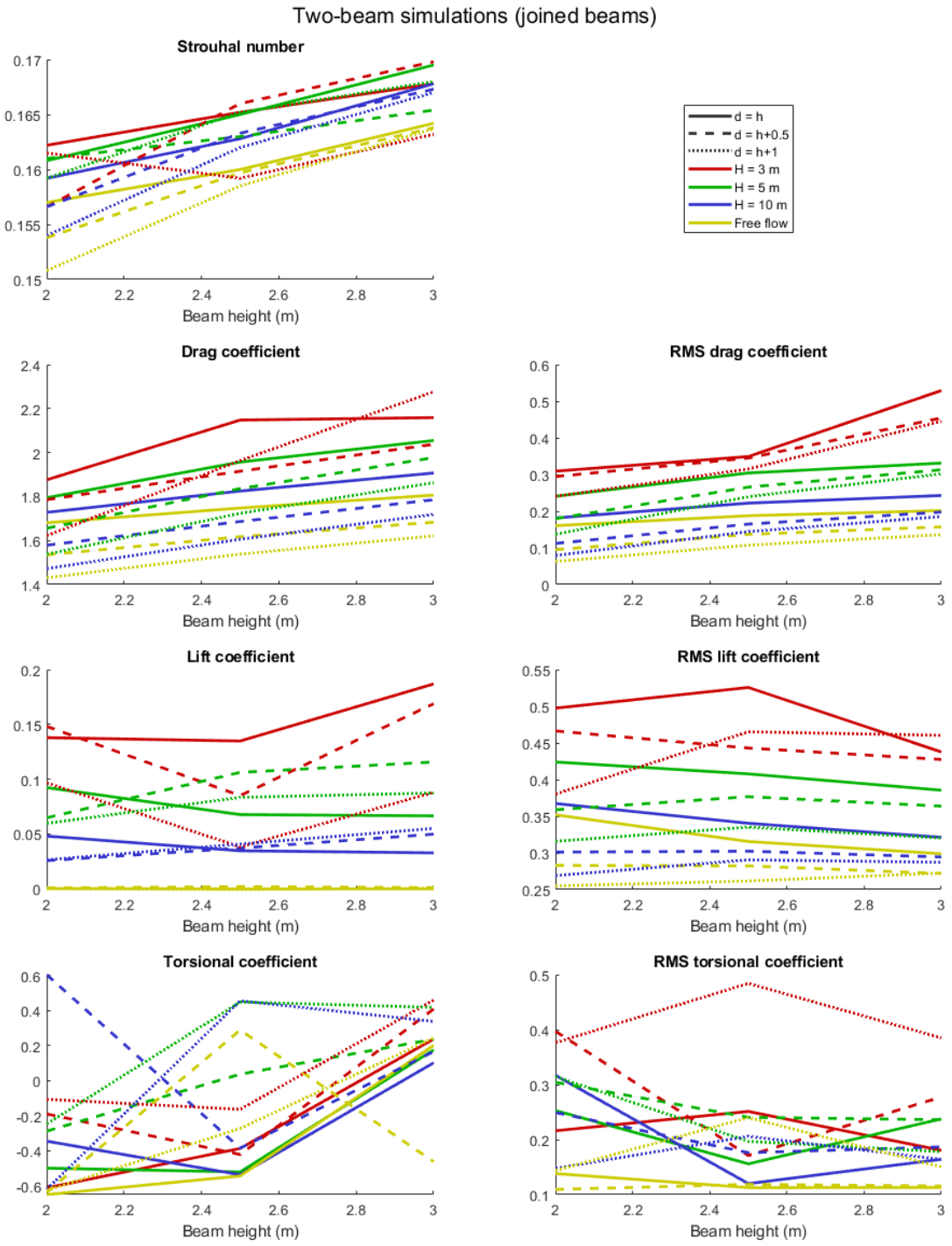


**Figure A.4:** Graphical representation of the average coefficients obtained for the case with joined beams in the second situation. Each color represents a different height of the bridge, while the style of the line represents the distance between beams.

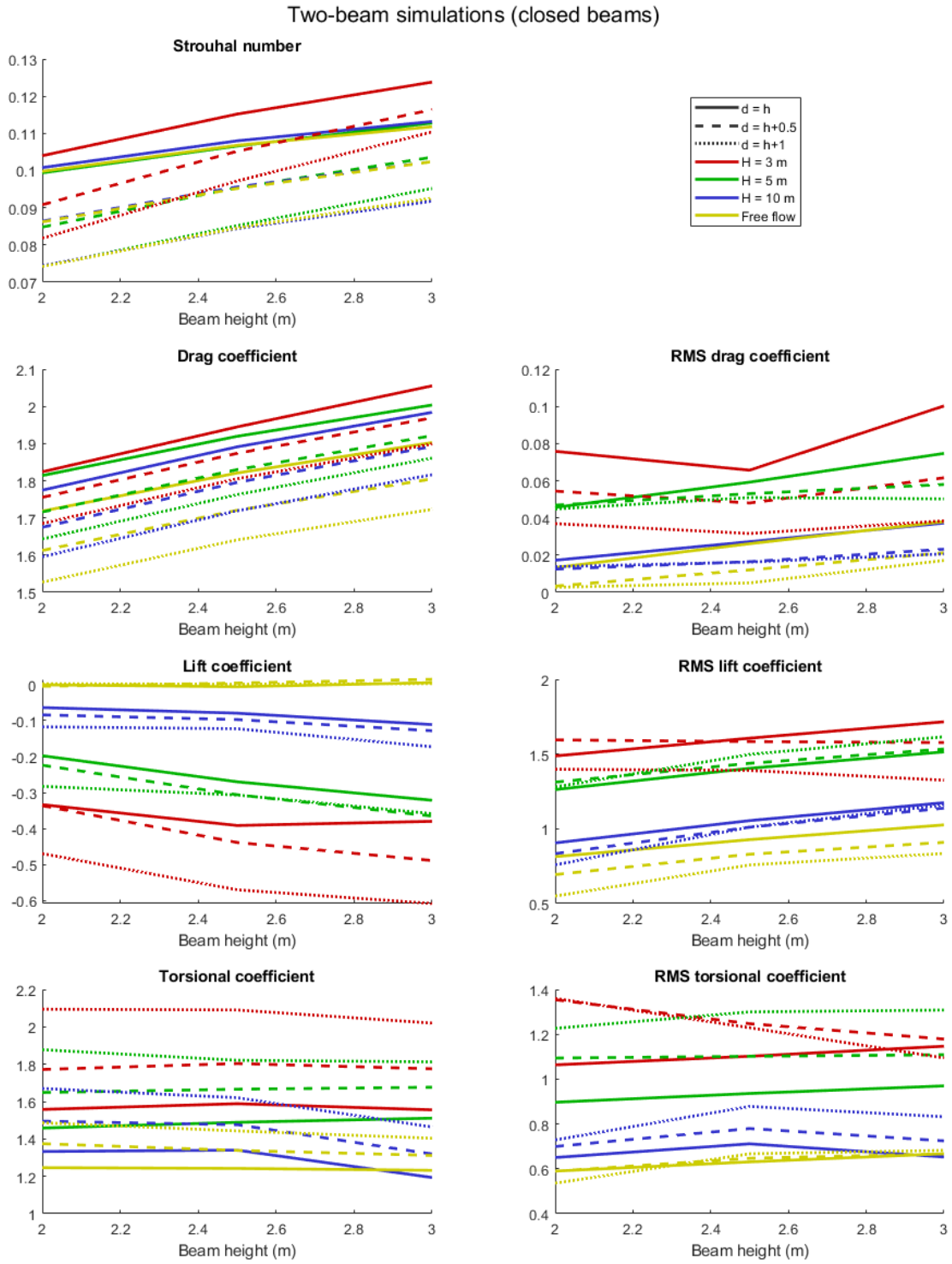


**Figure A.5:** Graphical representation of the average coefficients obtained in the situation with a closed section. Each color represents a different height of the bridge, while the style of the line represents the distance between beams.