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OMR Review Report - 2007

Abbreviations Used

ARG - Aspect Ratio of Genoa
ARM - Aspect Ratio of Mainsail
CV – (MATH) Coefficient of Variation (See **HERE**)
ERG – Efficiency Rating of Genoa
ERM – Efficiency Rating of Main
LBF – Length to Beam Factor
LOA – Length Overall
MSAG - Measured Sail Area of Genoa
MSAM - Measured Sail Area of Mainsail
MSASc - Measured Sail Area of Screecher
MSASp - Measured Sail Area of Spinnaker
MSASc - Measured Sail Area of Screecher
MYCQ – Multihull Yacht Club Queensland (inc)
OMR - Offshore Multihull Rule
RSAG - Rated Sail Area of Genoa
RSAM - Rated Sail Area of Mainsail
RL – Rated Length
RSA – Rated Sail Area
SD – (MATH) Standard Deviation (See **HERE**)
WE – Weight of Optionally added Equipment
WL – Length of Waterline
WS – Sailing Weight

Preamble

Following requests from MYCQ members and others, an OMR review committee was established in 2006 and called for written submissions evidencing proposals for changes to the OMR rule. While some of these submissions covered administration of the OMR, the balance related to concerns about the operation of the rule. Some submissions were statistically based, but most were anecdotal. In considering the diverse range of submissions, it became apparent to the committee that the original reasons for adoption of the OMR were not always clearly understood in the multihull sailing community.

For the review to progress, and to provide a context in which the variety of submissions could be evaluated, the committee deemed it necessary to restate the purpose of the rule.

The OMR and its parent, the Texel Rating Rule (widely used in Europe) are designated as 'Development Rules', to allow fair competition between diverse designs optimised to the rule. The OMR is intended to encourage new developments in multihull design with minimal constraints from prescriptions of the rule.

Quotes from Nico Boon, "father" of the Texel rule, in recent correspondence with the committee further illustrate the point:

"The basic idea behind the Texel rating formula (*read OMR*) is to leave designers as free as possible to develop hull forms, daggerboards, rigs, and rudders, everything as they believe best. They must not be inspired by a complicated rating system to find loopholes, to give some clients an advantage.' --- And further,

"That basic idea is the main reason that length, sail area and displacement only form the input. These three elements explain about 90% or a bit more of the actual performance. This is enough for a rating. Why is this enough? There is always such a variety in the performance of crews, that more refinement does not really make sense."

Aims of the review:

1: To conduct a comprehensive review of all aspects of the OMR:

2: To identify aspects of the rule where administrative process or mathematical modelling improvements to the rule could be made:

3: To develop and recommend appropriate changes to the rule:

Observations:

The committee makes the following observations about the reality of the rule:

A: That newer, 'cutting edge' designs, by seeking to optimise their craft relative to the existing competition, will usually have an edge over other vessels not specifically designed to the rule.

B: For sailors choosing to buy "Off the shelf" designs, cruising designs, or older designs that may not be adequately optimised for OMR in an "open" fleet, the more competitive options may be for "Class " or "Division" racing, where the diversity between vessels is prescribed by factors outside of the rule, e.g., size, age, power/weight ratios, cruising etc. OMR however, still remains an effective rating system to discriminate within these sub divisions.

C: That "One Design", regarded by most sailors as the ultimate test of crew ability, has recently become another option in local multihull sailing, at least in the trailable multihull arena. Even when vessels are considered as "One Design", however, there are usually sufficient variations in built weights and sail areas to make OMR ratings a fairer method of rating boat performance.

D: That the club provides a performance-based handicap to run in parallel with the OMR. This provides an opportunity to be fully competitive for boat/crew combinations that, for whatever reason, are not effectively optimised under OMR.

E: That in undertaking this review, the committee did not see it as its charter to depart from the existing concept of a development rule and replace it with a new handicap system. This process would, of necessity, have required considerably more complex measurement, resulting in a rating of increased technical complexity. As a consequence, among other things, this would have provided even greater opportunity for argument. Apart from the historically high rate of failure of rating systems that have gone down this more complex path, this approach was also deemed to be outside the immediate financial and technical resources of the club, in terms of both its implementation and administration.

Data Methodology:

Shorter inshore multihull races are more likely to be sailed in consistent wind patterns. These races generally provide smaller variations in race results, in part also due to less opportunity for crew error. This allows differences due to the measured variables of the rule to be more readily identified through statistical means. Due account was taken of the considerable "noise" in race result data due to crew errors, mishaps, differential weather effects etc.

After considering the diverse range of submissions, the committee has recommended changes to the OMR that are statistically more likely to reduce ***the spread of corrected times.*** The intended result is a spread of corrected times that reflects the relative performances of yachts and crews, after appropriate allowance has been made for variations in Length, Sail Area and Weight.

This data review process was conducted ***without reference to the effects of changes on any particular boat or class of boats***.

The development and testing of these changes on race data uses standard statistical maths techniques. A course in stat maths is beyond the scope of this paper. For those interested, summaries of the processes used can be found at the following website: **http://www.statsoft.com/textbook/glosfra.htm**

Changes Proposed:

After examining the various submissions to the committee, a number of administrative changes have been recommended.

1: Limit of only one on-line certificate allowed at any time.
Multiple ratings for different crew numbers will no longer apply.

2: Fee-per-change charged by MYCQ for new sail configurations.
(The measurer may also charge a further fee.)

3: Fee-per-year charged by MYCQ for website re-listing of ratings annually.

4: No hard-copy rating certificates.

5: No time limit for certification.
(The current requirement is full re-measurement every three years.)

6: Full re-weighing and re-measurement to be mandatory if hull changes occur.

7: Re-weighing optional at owners expense and prerogative at any time.

8: Recording of serial numbers of each measured sail to be based on MXXX-YY where XXX is normal vessel sail number, and YY is the sequence number for individual measured sails FOR THAT VESSEL. For identification, measurers will mark serial numbers on measured sails near the tack point, using indelible marking pen, in figures 50mm high, and sign. A separate serial number applies to each sail. These serial numbers are to be noted on the measurement data form, and will be transferred to the master spreadsheet. This will allow future confirmation by race officials and other competitors that correctly rated sails are being used.

Summary of OMR Committee findings

1: Crew Weights – Implement a system of "Declared Crew Weight" in conjunction with a default crew weight rating based on the Texel Rule, (RL * 40) - 70

2: WE - At the initial weighing of a boat, a minimum weight of removable items (WE) is determined that will always constitute part of Sailing Weight (WS). (Details below in section on RW)

3: Statistical assessment of the catamaran/ trimaran correction factor, or "K" factor in the Texel rule, has revealed no conclusive evidence in the local data to warrant its inclusion in OMR at this stage.

4: No proposal to measure or allow for either length to beam factors or float volumes of trimarans due to lack of supporting data for the degree of performance changes caused, and the inherent danger of measurement criteria leading to design distortions.

5: Maintain a watch on new developments such as canting rigs, lifting foils, battens in screechers etc.
While the possibility exists within the formula to rate canting rigs in a similar way to that of rotating masts, and also of rating foils, by applying a negative "drag" rating, the committee has opted, in the spirit of a development rule, to allow these innovations to run without penalty until adequate quantifiable evidence is available to the modify the rule if deemed necessary.

6: Although procedures and formulas for measurement of conventional sails are detailed in the Preamble to the OMR, these processes shall not restrict the measurer from using alternate means to obtain an accurate area for any sail which is an unusual shape and is deemed to require a different measuring technique. The measurer shall record the procedures used together with the actual measurements of such sails.

7: Apply a 0.01 (1%) drag allowance for open (without flaps) pivoting Centre-board cases.

8: Implement revised formulae for determining aspect ratios for the mainsail and jib/genoa. These aspect ratios are the basis for calculating new relative Efficiency Ratings for these sails.

9: Implement a modified method of Rated Sail Area calculation based more closely on the actual configuration and time in use of the various sails.
This is in preference to the present straight additive process where the rated sail areas of Main and Genoa are summed along with (arbitrary) percentages of the sail areas of the spinnaker, screecher, and other less used sails. (staysail, drifter etc.)

Note that there is NO INTENTION of using ACTUAL race time spent sailing to windward etc in the formula calculation.
The process is based on the premise, that for a typical course,
a.. Main and Headsail are carried to windward approx 65% of the race time
(or Main and Headsail and Mizzen for ketches)
b.. Main and Spinnaker are carried off the breeze approx 30% of the time. (Where the headsail is usually lowered)
c.. Main and Screecher (Headsail optional) where a screecher is on hand, may be used approx 5% of the time.
d.. Where a spinnaker is not used, and a screecher is on hand, the screecher replaces the time the spinnaker would be in use.

Recommended changes to the formulae:

The Rated Sail Area (RSA) calculation should then reflect the rated sails in use for the estimated times, where,
(RSA = Sail area in use for the % Time segment of sailing to windward +
Sail areas in use for the % Time segment of sailing off the breeze with spinnaker +
Sail areas in use for the % time segment of sailing off the breeze with screecher).
For a more detailed explanation, see the section below on Rated Sail Area.

As part of the review process, the committee undertook its own statistical analysis on the effects of each of the major parameters of the rule, i.e. Rated Length, Rated Sail Area and Rated Weight. Standard deviations in race results were calculated for a range of hypothetical changes to the OMR formula and expressed as Coefficients of Variation (SD as a percentage of the mean) for comparison between races. A 0.05 level of confidence was established for each data set per race before the result of any change could be regarded as significantly different from the OMR result, in either a positive or negative direction.

The results of 44 major OMR-rated events over 6 years involving over 500 race results were used of data comparison.
Two recent regattas, and a Brisbane Gladstone race, chosen for their diversity of conditions, were also examined in further detail for the operation of the rule and the effects of potential changes.
The Trailable Multihull National Titles, 2003, sailed from MYCQ on Moreton Bay, was predominantly a heavy wind regatta, sailed in conditions ranging from 20 to 30 knots.

The R.Q.Y.S. Multihull championship, 2006, was a more typical regatta using the OMR, sailed in moderate conditions, with most of the seasoned local racing boats entered, a mix of large and small multis, and a variety of courses.

Rated Length (RL)

While there was evidence to support the contention that Rated Length should be weighted more heavily in strong wind conditions, there was a trend in the opposite direction under more normal moderate conditions when the power weighting on RL was increased.
The committee concluded that RL should remain at, or close to its present weighting (RL^0.3) and observed that, while some boats will be favoured in heavier conditions, equally, others will be favoured in lighter conditions by the parameter of RL.
While questions of trimaran float buoyancy (design displacement of float relative to overall displacement of yacht) and the related measure of float length relative to the main hull length were raised in submissions, measurement data was not available to test whether either of these factors would prove a better predictor of performance if they were used to moderate RL. The committee noted that moving in this direction may impose design restrictions not in accord with the K.I.S.S. principles of the original rule.

Rated Weight (RW)

Whereas RL is essentially a straight forward measurement of waterline length (at a height 1.5% of LOA above WL), Rated Weight has been less clear cut in its application. It has included bare weight of the boat, sails, rigging, motors, anchors, safety gear etc kept permanently on the boat while racing. ***It does not include Water and Fuel.***
The existing crew weight allowance for OMR had been arbitrarily set at 100 Kg and made allowance for personal kit that may have been carried on long races.
It has been brought to the attention of the committee that, in the case of inshore day racing, where the OMR predominantly applies, that this allowance of 100Kg was very generous where extensive kit was neither needed nor carried, with the result that, particularly for inshore races, crew numbers have been manipulated to create a perceived weight advantage under the rule.
By way of comparison, under an earlier "Off the Beach" version of the Texel Rule, there was a crew weight allowance of 75 Kg per person. In the current Cabin Multihull version of the rule, which has now been used successfully for some time in Europe, a simple linear formula has been adopted. Crew weight allowance (for the purposes of the rating) = (RL*40)-70. Divide this figure by 75 to get an approximation of the crew numbers credited. In heavy conditions, skippers may choose to carry more crew for added stability, or sail with fewer crew members in light conditions.
In reviewing the question of crew weight rating allowances, the committee was conscious of the errors of crew number reporting and reworking of results in past events, both within the club and in external races using the OMR with its multiple ratings, dependent on crew numbers. The committee accepted the view that a single rating was administratively desirable. This view was supported by statistics from the QMC 06 regatta substituting the Texel crew weight rating for OMR to give a significant reduction in coefficients of variation in the results. A similar trend was evident in the 2006 Brisbane - Gladstone; however, it was not supported either way in the heavy wind 2003 Trailable regatta. There was even significant evidence from the QMC 06 regatta to support the possible elimination of crew weight allowances completely from the formula calculation, however, results from the Trailable regatta were significantly to the contrary of this notion.
Various views were put to the committee about the effects of adopting the Texel weight rating and its perceived favouring of larger boats. Some alternative skewed and curvilinear models of charting crew weight were proposed and tested, however the committee could not reach a consensus on the validity of this approach. Apart from some evidence for eliminating crew weight allowances from the rating calculation, all the other

weight models examined failed to reach the level of significance of the Texel Crew weight rule.
While the committee is aware that retrospective testing of a new crew weight rule under the conditions of the former (OMR) rule is of only limited value, it has taken the view, that the Texel Crew weight rule, a proven workable system in Europe, should provide the basis of any new crew weight rule.

Rated Weight – Crew weight component
While the OMR Review report has recommended the adoption of the Texel crew weight rating method where, crew weight allowance = (RLx40)-70, as a workable system for rating crew weight for the purposes of calculating a single rating under the proposed new OMR, the committee acknowledges that this "may" disadvantage smaller multihulls by:
(a) Discriminating against vessels carrying physically larger crew members, and
(b) Leading skippers to adopt a minimalist crew policy, which may, in adverse circumstances, compromise the safe operation of a vessel.

In view of the concerns expressed by skippers at the recent 2007 National Trailable Multihull Regatta, upon the limited release of the OMR Review Report, and following a well supported suggestion for an alternative approach to the question of crew weight allowance in the OMR, the committee now recommends a revised process to establish the crew weight component of the Rated Weight applicable to the new OMR.

Guiding principles:
1. Each yacht shall have only one current rating.
2. Any changes to the hull and/or sails requiring remeasurement, or to the rated weight, will incur a "Change of Rating" fee.

Rated Weight:
This shall include the measured weight of the hull, rig, and specified contents as per the measurement schedule, but not including crew, personal kit, consumables, fuel and water. To this shall be added "Declared minimum weight of crew".

Should a yacht, for whatever reason, not declare a minimum weight of crew, then the OMR officer shall assign a "Default" crew weight based on the Texel formula where:
Crew Weight = (RL*40)-70

Declared minimum weight of crew:
1. Each skipper shall declare a minimum weight of crew and 'carry on' kit (wet weather gear, personal safety harness and safety items, clothes and other personal items, not including consumables) normally carried on the yacht while racing.
2. A yacht may carry more than the declared minimum weight of crew without penalty.
3. In cases where the yacht may be short handed for an event, or a significant weight differential occurs when substitute crew are carried, such that the yacht fails to meet its declared minimum crew weight component, then that yacht shall make up the difference in the form of fixed ballast. This ballast shall be declared to the race committee before the start of the event.
4. The fixed ballast shall be "fresh water", carried in labelled, sealed, plastic containers which shall be secured approximately amidships in the vessel.
5. The ballast shall be separate from, and in addition to normal drinking water required on the vessel.
6. The ballast shall not be treated as movable ballast to assist the sailing balance of the yacht while racing.
7. It is expected that the average crew weight allowance will be in the vicinity of 70-85 Kg per crew member for inshore events. The Race Committee for an event shall retain

the right to check 'declared minimum crew weights' before the start or within reasonable time of the conclusion of an event.

The committee further noted that any concerns over minimum crew numbers, for safety or other reasons, should remain in the province of race organising authorities, or class rules. E.g., the minimum crew for acceptance of a Brisbane –Gladstone entry is 4, set by the race organising authority, not the OMR rule.
Finally, after examining the other elements of the OMR, in particular, changes to Rated Sail Area discussed in the following section, results of testing suggest that the power of the rated weight component in the formula should remain unchanged.(RW^ 0.325)

WE

WE applies only to those yachts which compete in AYF race categories 1, 2 or 3 in addition to the other categories where they wish to downgrade their equipment level for such race categories and thus reduce their all up weight.

Each item of equipment in WE is to be listed on the inventory form and weighed individually. The total weight of WE may not be varied without an official scrutiny and rating re-evaluation.

The skipper of the yacht must advise the race committee of the removal of WE when providing notice of entry to a race or regatta to avoid disqualification.

WE may include such items of equipment deemed necessary for racing in categories 1,2 and 3 as follows:

- Liferaft or equivalent dinghy
- Stove
- Extra batteries
- Navigation equipment
- Storm sails
- Other items of equipment at the discretion of the OMR officer.

WE may not include items for crew comfort, extra sails, different motors or consumables.

Associated Drag factors

Under the current OMR, a drag allowance has been made for propellers in various configurations. A similar drag allowance at 1% has been introduced for open pivoting centreboard case designs (no flaps). This applies to some trailable trimaran designs.

Rated Sail Area (RSA)

Rated Sail Area in OMR is determined by two separate components;

- Aspect Ratio of the working sails and,
- The relative weighting of different sails in the formula.

Aspect Ratio

This has been widely used in various rating systems as a basis for assessing the "efficiency" of different sails. In OMR, the formula used for the main has been (vertical projection of the luff squared/area). This has followed from the parent Texel Rule, which in turn was derived from an earlier Pacific Multihull Association rating. It was, however, implemented in the days of more traditional tall triangular shaped sails, where roach, when it was present, was not extreme. More modern materials and sail technology has produced demonstrably more "efficient" sails in the form of 'square top' and 'parabolic heads' where more area can be carried in the upper portions of the sail. These sails however, when rated using the present OMR aspect ratio, are effectively deemed to be less efficient than older style 'pin head' sails of similar size.

Following initial moves to correct this anomaly by the Texel Rating authority in Europe under the auspices of Nico Boon, the OMR committee has also undertaken its own investigation of the problem and associated measurement issues.

The committee now recommends a revised Aspect Ratio calculation and an efficiency formula, derived from a trendline curve of Aspect Ratios from a representative sample of boats drawn from the OMR database. This has been done separately for mainsails and jib/genoas. The new formulae more closely reflect the performance characteristics of contemporary multihull sails, while at the same time, providing a fairer rating for older style sails.

In the case of jibs/genoas, the new rating provides a progressively slower rate of increase in the efficiency rating, as the percentage of overlap increases. The new formula also has the capacity to rate "square top", style jibs effectively, should this style become common.

It should be noted that the relevant aspect ratio formula changes are supported by a significant reduction in the coefficient of variation in the race results data base used for this report.

While eliminating Aspect Ratio from the OMR formula was considered an option when compared with retaining the existing flawed AR formula, on the grounds that the differences in results between the two were not statistically significant, it became apparent that the new AR and efficiency formulae were reflecting performance differences between yachts effectively.

For the purposes of measurement and calculation, LPG and LPM are the perpendiculars to the longest side of the largest triangle contained within the head, tack and clew of the respective sails. Using these existing measurements within the OMR convention, this will be LPM to ML1 for the main and LPG to LL for the genoa/jib.

Mainsail calculation:

AR Main = MAM/LPM^2
Efficiency Rating of Main (ERM) = 0.65(AR Main^0.298)
RSA Main = (ERM*MAM) + Measured Area Mast (if rotating)
(Also applies to Mizzens and second Mainsails)

Jib/Genoa calculation:

AR Genoa = MAG/LPG^2
Efficiency Rating of Genoa (ERG) = 0.72(AR Genoa^0.298)
RSA Jib/Genoa = (ERG*MAG)

(Also applicable to Staysail & Drifter)

Weighting of sails
Under the previous OMR and current Texel Rules, a simple additive system applies to Rated Sail Areas. For OMR, it was Total RSA = RSA main, plus RSA genoa, plus 7% MSA spinnaker, plus 5% MSA screecher, plus RSA staysail, plus RSA drifter (=0.3(MSAD-MSAG), plus 0.5 RSA mizzen or second main if applicable.
For Texel, by comparison, it is the RSA main, plus RSA genoa, plus 7% MSA spinnaker, plus 10% MSA screecher, plus 15% RSA staysail, plus 15% RSA drifter, plus RSA mizzen or second main (unspecified).

Various representations were made to the committee about the sail area ratings of the spinnaker, screecher and genoa/jib. The committee also noted anecdotal evidence on the following:

Spinnaker. This sail was seen by some skippers as very under-rated. In an attempt to optimise their vessel under the existing rule, the response in some cases, has been to carry the largest masthead spinnaker possible, as this was considered 'free' or at least 'cheap' sail area under the rating at 7% MSA Spin.

Screecher. The lowering of the rating on screechers from 10% to 5% appears to have led to their increased use. However, a move to take advantage of the revised screecher rating has also been noted, whereby screechers of maximum mid girth are carried in lieu of spinnakers at a lower rating.

An analysis of race data revealed that increasing the power weighting of RSA in the formula produced contrary results in reducing the coefficient of variation (CV) in race data. In the case of the heavy wind 2003 trailable regatta, it significantly decreased the CV, whereas in the QMC 06 regatta, it resulted in a significant increase in CV.
In order to arrive at a better understanding of what was happening with RSA in the OMR formula, a different concept of treating RSA was explored, based on work with a rule previously used at earlier Australian trailable multihull regattas.
For the purposes of assessing RSA, sail area is divided into a windward component and an offwind/downwind component.
Based on earlier experience with the trailable multihull rating rule, and some subsequent on-water testing, the time spent sailing to windward , *on average,* on 'round the buoys' triangular style courses and for average windward and return races around fixed marks, is approximately 65% of the time and downwind/offwind, approximately 35% of the time. These percentage values are also supported in the relevant race data analyses as providing the best 'fit'. The exception however, is one-way passage races, either fully downwind or fully upwind, that will always be problematical under any rating rule which seeks to strike a fair balance in rating all points of sail. To some extent, these differences are evened out over successive events in different weather patterns, if not during the course of a single race.
For the purposes of the proposed new rating, the full mainsail is deemed to be carried 100% of the time. The principal foresails, made up of largest genoa/jib, largest spinnaker, and largest screecher are deemed to be carried either singly or in combination, for 100% of the time. (Unusual sails and combinations are treated separately later to avoid undue complication of the basic principle, i.e. staysails, drifters, mizzens twin mains etc. and may only affect around 1% or less of the current rated fleet).

Windward component:

The full mainsail is rated at 65% of rated area, - where the rated area is the measured area modified by an efficiency factor.
65% RSAM where RSAM =(MSAM*ERM)+Rated Area Mast
RSAM is Rated Sail Area of Mainsail + Mast
MSAM is Measured Sail Area of Mainsail
ERM is Efficiency Rating of Mainsail

The largest genoa or jib is rated at 65% of rated area, where the rated area is the measured area modified by an efficiency factor.
65% RSAG where RSAG = MSAG*ERG
RSAG is Rated Sail Area of Genoa
MSAG is Measured Sail Area of Genoa
ERG is Efficiency Rating of Genoa

Offwind/Downwind component:

The mainsail is usually carried all the time.
The off-wind /downwind component of the main is 35%.
The off-wind /downwind component of the principal foresails is 35% of their measured area as modified by a constant correction factor 'Z'. Where a jib/genoa forms part of the calculation of the offwind/downwind component, its rated sail area will be used.
The largest foresail will carry a minimum 30% rating, this may be either the largest spinnaker, largest screecher, or largest genoa/jib, depending on the sail combination on board.
The remaining 5% will be allocated to the screecher or genoa, whichever is the larger, on the basis that, in the absence of a screecher, the genoa will be carried freed off. Where both a screecher and genoa are on board, the rated area of the screecher shall not be less than that of the largest genoa/jib. The current screecher definition remains in place, i.e. ScMG > 50%ScF.
That is, the screecher mid-girth measurement must be greater than 50% of the screecher foot length measurement.
The four major sail configurations covering the majority of the current multihull racing fleet are as follows:

Mainsail and Genoa/jib only

Windward Offwind/Downwind
(.65 RSAM + .65 RSAG) + (.3 RSAM + .3 * RSAG) +
(.05 RSAM + .05 * RSAG)

Where
RSAM is Rated Sail Area of Mainsail
RSAG is Rated Sail Area of Genoa

Mainsail, Genoa/jib and Spinnaker only

Windward Offwind/Downwind
(.65 RSAM + .65 RSAG) + (.3 RSAM + .3 * Z * MSASp) +
(.05 RSAM + .05 * RSAG).

Where
Z is a correction constant – see Z note below.
MSASp is Measured Sail Area of Spinnaker

Mainsail, Genoa/jib and Screecher only

Windward Offwind/Downwind
(.65 RSAM + .65 RSAG) + (.3 RSAM + .3 * Z * MSASc) +
(.05 RSAM + .05 * Z * MSASc)
Where
Z is a correction constant – see Z note below.
MSASc is Measured Sail Area of Screecher
To be classed as a Screecher, MSASc must be equal to or larger than MSAG

Mainsail, Genoa/jib, Spinnaker and Screecher

Windward Offwind/Downwind

(.65 RSAM + .65 RSAG) + (.3 RSAM + .3 * Z * MSASp) +
(.05 RSAM + .05 * Z * MSASc)

Where

Z is a correction constant – see Z note below.
MSASp is Measured Sail Area of Spinnaker
MSASc is Measured Sail Area of Screecher

NOTE
To be classed as a Screecher, MSASc must be equal to or larger than MSAG
To be classed as a Spinnaker, MSASp must be equal to or larger than MSASc

"Z" constant:

For the downwind component, the measured areas of the downwind sails (spinnaker & screecher), are used, unmodified by aspect ratio or other efficiency factor, to minimize any constraints on the design or cut of these sails. To compensate for the extra weighting that measured areas of downwind sails would add to the formula relative to the efficiency rated areas of windward sails, a constant correction factor ("Z" = 0.85) has been calculated from the extensive club OMR data base reflecting the overall reduction between measured and rated areas for the mainsail and genoa /jib, as a result of the application of efficiency factors, i.e. aspect ratio, in calculating the rated sail area of these sails. In the case of the genoa/jib, this was 82% and in the case of the mainsail, 85.3%. On a combined pro-rata basis, the figure is 85%. This is the constant correction "Z" applied uniformly to the downwind component of the above mentioned foresails.

It should be noted at this point that two different 'efficiency' models were tested on race data looking at a combination of "flatness" and aspect ratio for spinnakers and screechers. While both proved to provide significantly lower coefficients of variation on race results, compared with the existing OMR, the model cited above, with the downwind component of RSA of foresails unmodified by efficiency factors applied to individual sails, proved better.

After evaluation of the proposed changes to RSA, the committee concluded that the power component of RSA should remain at RSA^0.4

The OMR – Texel constant - options

This constant, which determines a yachts rating relative to 1.000, can be set in a number of ways, either statistically, or more arbitrarily, by tying it to the rating of the top rated boat, or other known boat.
Statistically: (a) Assuming ratings for the fleet (data base) are distributed on a normal curve, the constant is set so that 95.45% (2 Standard Deviations) of the fleet have a rating that falls below 1.000
(b) A simpler statistical method is to set the constant so that, say 80% or 90% of ratings fall below a rating of 1.000. On the current (V-8) OMR data base, 21% of minimum crew ratings exceed 1.000, a figure the committee deems to be excessive.
An alternative arbitrary method is to set the top rating yacht at a figure of, say, 1.2500, and calculate the constant from this bench mark.
A further arbitrary method, which has immediate appeal because of the opportunity for direct comparison, is to tie it to the rating of an existing well performed, well known boat and use this yacht as the basis of the constant. A variation would be to take a select group of five to ten known yachts and use averages to determine the constant so that the new rating rule will reflect ratings in a similar band to the old rating rule.

The committee recommends that the constant be statistically based at 90% of ratings falling below 1.000. This should be calculated from the 100 most recent ratings added to the club data base and that this constant is subject to review every three to five years to reflect changes in the nature of the local fleet. Under the revised formula, with the constant set at 1.0, this criterion will be met.

NOTE: Changing this constant has NO effect on the rating relativity of any boat's rating with respect to any other boat's rating.

Rated Sail Area Formulae

(See above for amendments "Z", extra conditions etc)
These are shown in un-simplified form for explanatory purposes.

For boats with NO Spinnaker and NO Screecher
RSA = .65 (RSAM + RSAG) + .3 (RSAM + RSAG) + .05 (RSAM + RSAG)
For boats With Spinnaker AND Screecher
RSA = .65 (RSAM + RSAG) +
.3 (RSAM + (Z * MSASp)) + .05 (RSAM + (Z * MSAScr))

For boats with Spinnaker (and No Screecher)
RSA = .65 (RSAM + RSAG) +
.3 (RSAM + (Z * MSASp)) + .05 (RSAM + RSAG)

For boats with Screecher (and No Spinnaker)
RSA = .65 (RSAM + RSAG) +
.3 (RSAM + (Z * MSAScr)) + .05 (RSAM + (Z * MSAScr))

To be classed as a valid Screecher, MSASc must be equal to or larger than MSAG
To be classed as a valid Spinnaker, MSASp must be equal to or larger than the larger of MSASc or MSAG
Note that the conditional limits for screechers and spinnakers remain,
that is,
Screecher Mid Girth must be greater than 50% of foot measurement,
Spinnaker Mid Girth must be greater than 75% of foot measurement

Other Sails:
The rating of staysails, drifters, mizzens etc. is largely academic, as only one yacht out of 150 on the data base carries one of these sails, and that vessel is no longer actively racing.
Staysails and drifters will have their measured areas modified by a similar efficiency rating as applies to the jib/genoa.
RSA Drifter = 0.3 (RSA Drifter – RSA Genoa) where RSA Drifter = ERDr*MADr
RSA Staysail = ER Staysail*MASt
ERDr and ERSt = 0.72*(ARDr or ARSt)^0.298

Mizzens and second mainsails in a fore and aft configuration shall have an efficiency rating applied as per the mainsail and 50% of their area added to the rated area of the mainsail.
In the case of twin mainsails mounted in parallel, the sum of the rated areas of both sails shall be used.
To avoid unnecessary complication of the final RSA formula, provision has been made for manual entry of data in these unusual cases.

Rating Accuracy:

After investigating the combined mathematical effect of accuracies of measured values in the OMR, the committee has concluded that stating an OMR rating to more than 3 digits of accuracy is of questionable value.

The committee recommends that OMR be listed to 3 places of decimals, applying the normal rounding rules.

Conclusion:

The review process has involved the evaluation of a variety of submissions on the administration and operation of the current OMR.

The committee has sought to:

Re-define the intent of the OMR, in the light of conflicting opinions of its purpose.

Refine the administration of the OMR and make it available solely on-line, as more multihull bodies in Australasia, other than MYCQ, seek to use it as a rating system.

Relinquish the more complex and error prone multiple rating system for crew weight of the current OMR in favour of a system of declared crew weight. Where this is not enacted, the Texel crew weight formula will be applied as a default.

Identify aspects of the RSA that have led to inequalities in the final rating.
The Aspect Ratio formula of working sails has been revised and a derivative Efficiency Ratio used to calculate the RSA of these sails.
A modified system for weighting RSA has been proposed, that statistically, is likely to lead to a smaller spread in corrected time results.

The committee notes that all the proposed changes to the formulae are unlikely to lead to wholesale changes in race results. The same well-sailed and OMR-optimised boats will still contend for major placings in events under OMR, although margins between the boats should be smaller.

The committee also notes that there have been significant changes in the nature of local race fleets over the last decade and in the new technologies available to them. With this in mind, the committee recommends that the OMR should be subject to regular review every 2 – 5 years, depending on the quantifiable impact of new developments in the fleet.

Further, OMR will not function consistently and validly unless measuring is consistent in method and accuracy, accompanied by quality administration. Such goals will only be achieved through Measurer Education based on an effective written Syllabus.
The committee recommends the establishment of a training course for persons interested in gaining qualification for measuring boats under OMR.

Committee:

David Gemmell (Chair)
Geoff Cruse
Bob Forster

Expanded Committee members:

Don McWatters
Mike Hodges December 2007