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8 November 2018

Ms Carina Oh  
Assistant Director  
Anti-Dumping Commission  
Level 35, 55 Collins Street  
Melbourne  
Victoria 3000

By email

Dear Carina

## Scaw South Africa and Haggie Reid Anti-circumvention inquiry – wire ropes from South Africa

We write further to our submission of 23 October 2018 and in response to the submission of BBRG Australia Pty Ltd (“BBRG”) dated 9 October 2018, as has been placed on the public record of this inquiry.

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BBRG’s submission overflows with falsehoods, *non-sequiturs* and self-contradictions. It further reveals how unfounded BBRG’s position truly is. Our clients have and will continue to discuss the matter of wire ropes in an intellectually and technically honest manner. BBRG evidently will not. Instead, BBRG has strayed even further from the facts, and has resorted to building its case on even more elaborate fiction.

BBRG’s claim that our clients’ 9 strand wire rope is a “slight modification” of 6 and 8 strand wire ropes is untenable.

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## A Relevant information, not “complication”

BBRG alleges that our clients have sought to “unnecessarily complicate” the present investigation. Our clients have done no such thing. Wire ropes are complex products, the design, selection and use of which requires technical and practical expertise. If a comparison between different wire ropes is called for - which is the very crux of this investigation - then a background explanation is necessary in order to impart a fundamental understanding of wire ropes. Our clients have sought to equip the Commission with a technical understanding of the products under consideration, not least because BBRG has failed to do so. BBRG’s submission in July went in the opposite direction, and attempted to lead the Commission away from appreciating the true complexities of wire rope, and the innovation that is our clients’ 9 strand wire rope.

Evidently, BBRG appreciates the fact that it is not in its interests for the Commission to be made aware of the differences in wire rope specifications and performance because once that veil is lifted, it is obvious that 9 strand wire rope is not a slight modification of 6 and 8 strand wire ropes.

The motivating factor behind the development of the 9 strand wire rope was to produce a wire rope with enhanced capabilities and performance in the pursuit of strengthening our clients’ position with its customers as the trendsetter manufacturer, with tailored and more cost-effective solutions. Our clients pioneered the introduction of 8 strand wire ropes into the Australian market around 15 years ago. This gave them a significant market edge. The introduction of 9 strand wire ropes constitutes another step forward in our clients’ product and market development.

## B BBRG misrepresents our clients’ position in a number of ways

First, we note that on page 2 of BBRG’s submission, the following assertion is made.

BBRG Australia considers it necessary to clarify the Respondents’ comments surrounding Rope Properties, as most are not relevant to the circumstances of the anti-circumvention inquiry. For example, the strength of the rope is not based on construction only, but, also on size and grade, a 6 strand 8mm diameter rope does not possess the same breaking load as a 50mm rope.

This assertion knowingly misrepresents our clients’ position. Our clients have never alleged that rope strength is based solely on rope construction, as BBRG insinuates. Moreover, our clients thoroughly agree that “a 6 strand 8mm diameter rope [may] not possess the same breaking load as a 50mm rope” – this is the essence of our clients’ illustrative example on page 5 of its submission of 12 September 2018.

Secondly, on page 2 of BBRG’s submission, BBRG asserts that our clients’ reference to crane ropes “adds no value” because of their smaller diameters (e.g. the 8mm and 50mm diameter ropes shown in Table 1 of our clients’ submission). Not less than two paragraphs later, BBRG attempts to argue its own case by reference to two ropes, one that is 6mm in diameter, the other 50mm in diameter. Thus, according to BBRG, when our clients refer to the two different ropes, it “adds no value”. Yet BBRG itself compares two identically-sized ropes, presumably because it thinks that its comparison does “add value”.

Thirdly, pages 7 and 8 of our clients’ submission introduces basic theory underlying crushing and rope rotation. BBRG even attacks these merely illustrative examples, and in so doing commits more untruths. BBRG asserts that our clients’ 9 strand wire ropes are not exposed to issues of crushing. This assertion is categorically false. It is not only multi-layer wound ropes that experience crushing. As per our clients’ submission, wire ropes are crushed by external pressure. Our clients’ 9 strand ropes are exposed to such external pressure. For example, 9 strand ropes are crushed when they are bent over the overburden at a mine site. Additionally, crushing of a single layer wound rope occurs when it is engaged with undersized sheaves and drum groove profiles. This is a common problem in the mining applications in which the subject ropes are used.

Fourthly, BBRG asserts that Figure 7 in our clients' submission is outside the scope of this investigation. As would be clear to the attentive reader, Figure 7 is an illustrative example used to explain the theory underlying rope rotation and resistance thereto. Pages 20 and 21 of our clients' submission refer to this example to build a more detailed understanding of non-rotation rope properties, leading ultimately to our clients' related and confidential research and development.

Fifthly, BBRG says that it has deconstructed one of our clients' 9 strand wire ropes, and observes that it is not laid as per Figure 20 in our clients' submission. Any sensible reader would understand that Figure 20 was used illustratively to explain rotation-resistant rope properties. Our clients have never claimed that their 9 strand wire rope is laid as per Figure 20, and to say otherwise is a misrepresentation.<sup>1</sup>

## **C Differing views about strand selection supports difference**

BBRG has the following to say on page 2 of its submission:

*BBRG Australia acknowledges that there exists differing views as to the selection of strand quantity, however, this has not been an issue in the end-use applications for hoist, drag and dump ropes. The actual strand quantity was based on what was known in the market at the time of the application, and, in fact, reflects closely the definition used by Scaw in its anti-dumping claim from 2002, against a range of suppliers from China, Korea, UK and India. At the time of BBRG Australia's application (i.e. March 2017) there was no 9 strand wire rope used in any surface mining activities in Australia.*

This appears to be a plea to the Commission for protection against the importation of any kind of wire rope product not made by BBRG. We are not sure how BBRG proposes that it should be handed such protection. The inquiry underway relates to the question of whether 9 strand wire rope, which is not subject to measures, is a slight modification of the goods that are subject to measures. BBRG admits that there exist differing views as to the selection of strand quantity. Although it is hard to understand what is meant by the words "*this has not been an issue*", it is at least apparent from BBRG's own statements and from the evidence we have provided that, yes, there are differing views regarding strand quantity and that it most definitely is "*an issue*".

## **D Visual comparisons are relevant but necessarily ancillary**

BBRG reiterates the observation "*that the visual difference between an 8 and a 9 strand rope is not significant*". It is baffling why BBRG continues to resort to this subjective and naive argument. The differences between the products – which, by the way, are visible, even if BBRG says they are "*not significant*" – are not imparted by how they look. In this regard, the Commission is directed to page 17 of our clients' submission.

## **E BBRG's software models misrepresent our clients' technology**

BBRG asserts that our clients' 9 strand rope has a lower fill factor than corresponding 6 and 8 strand wire ropes. A critical point to note is that BBRG makes this assertion "*[i]n the absence of Scaw's detailed rope designs*". Ignorant of our clients' actual 9 strand rope designs, BBRG simply designed three ropes using its own software, and then proceeded to disparage our clients' wire rope based on its own software models.

The three ropes "designed in proxy" by BBRG, along with their predicted fill factors, are detailed in the table directly below:

---

<sup>1</sup> [CONFIDENTIAL TEXT DELETED – product development]

|                 | 83mm 6 x 49 | 83mm 8 x 36 | 83mm 9 x 31 |
|-----------------|-------------|-------------|-------------|
| Fill Factor (%) | 65.9        | 63.4        | 63.1        |

The fill factors of our clients' actual ropes is below:

|                 |                                                                  |
|-----------------|------------------------------------------------------------------|
| Fill Factor (%) | <b>[CONFIDENTIAL TEXT DELETED – Scaw product specifications]</b> |
|-----------------|------------------------------------------------------------------|

As is evident, the fill factor of our clients' 9 strand rope is higher than its corresponding 6 and 8 strand ropes, which is completely opposed to the finding that has been arrived at by BBRG's software.

Questions relating to rope properties such as fill factor can be answered factually by reference to our clients' actual ropes. BBRG's own postulations and conjecture, stemming from its own rope designs and software models are wrong and irrelevant. The inaccuracy of BBRG's fill factor predictions merely underscores that its own rope designs and software do not reflect the properties of our clients' ropes.

Since BBRG created its own rope designs, and because they are so different from our clients' actual ropes, could it be the case that BBRG purposely selected design parameters that would result in a fill factor that declines with increasing strand quantity? The way this could be achieved would be by manipulating software design parameters such as strand gap, wire gap, strand diameter and compression to arrive at "odd" fill factor predictions. Indeed, we believe that there is evidence to suggest that BBRG did choose design parameters that would result in the deflating fill factors that it has submitted to the Commission, as we now explain.

On pages 4 and 5 of BBRG's submission, the designs of BBRG's 83mm 9 x 31 and 8 x 36 ropes are shown. It can be seen in the graphical user interface of the software used that the "target diameters" for each rope design is 83.000mm, as reproduced below:

|             |           |
|-------------|-----------|
| Geometry    |           |
| Target Diam | 83.000 mm |
| Actual Diam | 84.620 mm |

|             |           |
|-------------|-----------|
| Geometry    |           |
| Target Diam | 83.000 mm |
| Actual Diam | 84.659 mm |

However, on page 6 of BBRG's submission, the target diameter for BBRG's 6 x 49 rope is 85.075mm:

|             |           |
|-------------|-----------|
| Geometry    |           |
| Target Diam | 85.075 mm |
| Actual Diam | 84.317 mm |

Despite choosing a target diameter of 85.075mm for its 6 x 49 rope, BBRG presents the corresponding predictions as though it were an 83mm rope.

It is already an established fact that our clients' 9 strand rope has a higher fill factor. BBRG's own software modelling is not only unnecessary, it is vulnerable to manipulation. Moreover, its failure to predict the properties of our clients' ropes demonstrates that BBRG is ignorant of our clients' 9 strand

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wire rope, and has not been able to replicate our clients' innovative design. Another explanation is that it chose design parameters that created the result that BBRG wanted for the purposes of its submission.

## F Misuse of mathematical equation

BBRG asserts that our clients' 9 strand wire rope is weaker than our clients' 6 and 8 strand rope. BBRG's assertion is based on a mathematical equation borrowed from the Australian Standards 3569. There are several reasons why BBRG's assertion cannot be accepted.

Firstly, let us consider the disclaimer that precedes the equation. The disclaimer is shown in red underlining below:

**7.4.4 Breaking force based on component tests**

For six-strand rope (round or triangular strand) and eight-strand rope having a breaking force in excess of 1500 kN, the following method of test is allowed as an additional alternative to the methods of testing referred to above. Each of the component strands and, if applicable, the wire rope core from a sample of the completed rope is tested and the rope breaking force is calculated from the component strand and core tests as follows:

(a) For wire rope with either six or eight round strands:

$$\text{Rope breaking force} = \frac{\text{sum of the test breaking force of each strand} \times 0.925}{\text{IWRC test breaking force} \times 0.45}$$

Clearly, the equation is only applicable to 6 and 8 strand wire ropes with a particular strand geometry and breaking force. This equation is not applicable to ropes with 9 strands and cannot be used to predict the breaking force of our clients' 9 strand wire rope. Any assertions BBRG makes about our clients' 9 strand wire rope which are based on this equation should automatically be discredited.

Secondly, let us examine just how inapplicable the equation is to our clients' 9 strand wire rope. To do this, an understanding of breaking force and the equation is required. This is explained below.

The most accurate way to determine the breaking force of a wire rope is to actually break it using a *tensile tester*. A tensile tester gradually loads a rope until it breaks. This allows one to determine how many kilonewtons<sup>2</sup> (kN) a rope can withstand before it breaks. However, wire ropes are strong structures which can withstand thousands of kilonewtons; ascertaining a rope's breaking force by actually breaking it requires an expensive and heavy duty tensile tester. Not all rope manufacturers are equipped with or have access to a sufficiently strong tensile tester. These rope manufacturers **[CONFIDENTIAL TEXT DELETED – proprietary knowledge or opinion]** may rely on software or mathematical equations to predict the breaking forces of ropes.

One way to predict the breaking force of a rope involves adding up all the breaking forces of its individual wires. For example, consider a hypothetical rope made from 1,000 individual wires, each wire having a breaking force of 4kN. The breaking force of the rope as a whole would be something similar to the sum of the breaking forces of its 1,000 wires. In this case, the breaking force of the rope might approximate 4,000 kN (1,000 x 4kN). However, the breaking force of a wire rope is always some factor lower than the sum of the breaking forces of its constituent wires. This is known as a *spinning loss*, and depends on a myriad of variables such as how the wires are wound and how the strands are arranged. In the case of our hypothetical rope, if tensile testing of the rope reveals that it breaks under a load of 3,000 kN, then the actual breaking force of the rope is 75% of the sum of the

<sup>2</sup> A newton is the international unit of measure of force.

breaking forces of its constituent wires. As such, the spinning loss for this rope is 25%. In this case, the equation for predicting the breaking force of our hypothetical rope is as follows:

$$\text{Rope breaking force (kN)} = \text{sum of the breaking force of each wire} \times 0.75$$

This is essentially how the equation cited by BBRG works. Let us consider the equation again:

(a) For wire rope with either six or eight round strands:

$$\text{Rope breaking force} = \frac{\text{sum of the test breaking force of each strand} \times 0.925}{\text{IWRC test breaking force}} \times 0.45$$

In the equation, rather than apply a spinning loss to the whole rope in its entirety, the equation applies one spinning loss to the outer strands of the rope, and another spinning loss to the independent wire rope core ("IWRC") of the rope. In particular, the spinning loss applied to the outer strands is 7.5% and the spinning loss applied to the IWRC is 55% (i.e. the inverse of the 0.925 and 0.45 figures in the equation). Now that we understand how the equation works and what it is doing, we can examine how inapplicable it is to our clients' 9 strand wire rope.

Scaw has tested the actual breaking strength of its 9 strand wire ropes using a 15 meganewton tensile tester. This testing reveals that the spinning loss applicable to our clients' 9 strand wire ropes is between [CONFIDENTIAL TEXT DELETED – number]% to [CONFIDENTIAL TEXT DELETED – number]%. Therefore, the actual spinning loss applicable to our clients' 9 strand rope is nowhere near the two spinning losses used in the equation (7.5% and 55%).

Moreover, the equation grossly underestimates the strength of the IWRC of our clients' 9 strand wire rope. By applying a spinning loss of 55% to the IWRC, the equation is effectively saying that the breaking force of the IWRC is only 45% of the sum of the breaking forces of its constituent wires. As BBRG has acknowledged, "[i]t is natural for the core to be larger for a given rope diameter when the number of outside rope strands increase". Consistent with this fact, the IWRC of our clients' 9 strand rope [CONFIDENTIAL TEXT DELETED – Scaw product specifications]. As such, to apply a spinning loss of 55% to our clients' IWRC is inaccurate to the extreme, and severely underestimates its strength. There is strong reason to believe that BBRG has cited this equation precisely because it grossly understates the breaking force of our clients' 9 strand wire rope.

There is a third reason why BBRG's assertions based on this mathematical equation should not be accepted. The Commission will recall that BBRG used software to predict the fill factors of three of its own ropes. The graphical user interface of the software shows rope design parameters which can be used to calculate the actual spinning losses that BBRG applied to its own ropes. It will be seen that the spinning losses used by BBRG in its own software do not match the spinning losses used in the equation, nor the spinning loss applicable to our clients' actual 9 strand wire rope.

With reference to the below screenshots, the following rope design parameters and properties are shown:

- breaking force (shown in the red box)
- cross-sectional area of the rope (shown in the orange box)
- tensile strength of the wires which form the rope (shown in the blue box)

These figures allow us to calculate the spinning losses used in the software. These calculations are shown in the Table below:

Figure 1 – 83mm 9 x 31 rope

|             |                  |                |           |
|-------------|------------------|----------------|-----------|
| Properties  |                  | Geometry       |           |
| Calc BF     | 4239.1 kN        | Target Diam    | 83.000 mm |
| Dry Mass    | 2767.3 kg / 100m | Actual Diam    | 84.620 mm |
| Product Eff | 77.1 %           |                |           |
| Fill Factor | 63.1 %           |                |           |
| Metal Area  | 3547.9 sq mm     |                |           |
| Composition |                  |                |           |
| Tensile     | 1770             |                |           |
| Finish      | B                |                |           |
| Class       |                  |                |           |
|             |                  | Inherit Values |           |

Figure 2 – 83mm 8 x 36 rope

|             |                  |                |           |
|-------------|------------------|----------------|-----------|
| Properties  |                  | Geometry       |           |
| Calc BF     | 4275.6 kN        | Target Diam    | 83.000 mm |
| Dry Mass    | 2782.5 kg / 100m | Actual Diam    | 84.669 mm |
| Product Eff | 77.0 %           |                |           |
| Fill Factor | 63.4 %           |                |           |
| Metal Area  | 3567.2 sq mm     |                |           |
| Composition |                  |                |           |
| Tensile     | 1770             |                |           |
| Finish      | B                |                |           |
| Class       |                  |                |           |
|             |                  | Inherit Values |           |

Figure 3 – 83mm 6 x 49 rope

|             |                  |                |           |
|-------------|------------------|----------------|-----------|
| Properties  |                  | Geometry       |           |
| Calc BF     | 4250.0 kN        | Target Diam    | 85.075 mm |
| Dry Mass    | 2872.3 kg / 100m | Actual Diam    | 84.317 mm |
| Product Eff | 77.6 %           |                |           |
| Fill Factor | 65.9 %           |                |           |
| Metal Area  | 3682.4 sq mm     |                |           |
| Composition |                  |                |           |
| Tensile     | 1570             |                |           |
| Finish      | B                |                |           |
| Class       |                  |                |           |
|             |                  | Inherit Values |           |

| BBRG's rope | Tensile strength (MPa)* | Cross-sectional area of rope (mm <sup>2</sup> ) | Aggregate breaking force of wires (kN)** | "Calc BF" (kN) | Spinning loss*** |
|-------------|-------------------------|-------------------------------------------------|------------------------------------------|----------------|------------------|
| 9 x 31      | 1770                    | 3547.9                                          | 6279.783                                 | 4239.1         | 32%              |
| 8 x 36      | 1770                    | 3567.2                                          | 6313.944                                 | 4275.6         | 32%              |
| 6 x 49      | 1570                    | 3682.4                                          | 5781.368                                 | 4250           | 26%              |

\* MPa denotes megapascal, which is a unit of pressure

\*\*  $\text{Aggregate breaking force of wires (kN)} = \frac{\text{Tensile strength (MPa)} \times \text{cross sectional area (mm}^2\text{)}}{1000}$

\*\*\*  $\text{Spinning loss} = \left(1 - \frac{\text{Calc BF (kN)}}{\text{Aggregate breaking force (kN)}}\right) \times 100$

As can be seen, within its own software BBRG applied a spinning loss of 32% to its 8 and 9 strand wire ropes, and a spinning loss of 26% to its 6 strand wire rope. Neither of these spinning losses come close to the 7.5% and 55% spinning losses used in the mathematical equation, nor the [CONFIDENTIAL TEXT DELETED – number]%-[CONFIDENTIAL TEXT DELETED – number]% spinning loss applicable to our client's 9 strand wire rope. One must wonder why BBRG relied on one set of spinning losses in its software, and another set in the mathematical equation.

The above findings are summarised below:

| <b>Spinning losses BBRG selected within its own software</b>  | <b>Spinning losses used in mathematical equation</b> | <b>Actual spinning loss of our clients' 9 strand wire rope</b> |
|---------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|
| 32% for the 8 and 9 strand ropes<br>26% for the 6 strand rope | 7.5% for the outer strands<br>55% for the IWRC       | <b>[CONFIDENTIAL TEXT<br/>DELETED – numbers]</b>               |

While we are currently scrutinizing BBRG's software design parameters, the Commission will notice that the tensile strength parameter chosen for BBRG's 6 x 49 rope differs from that of its 9 x 31 and 8 x 36 wire ropes. Why is that? In order to predict the differences an additional ninth strand might make to a rope, one would compare the 9 strand wire rope to a differently stranded rope with all other parameters unchanged as far as is possible. For example, to predict the differences an extra ninth strand might make, one could compare a 9 strand rope to an 8 strand rope with an identical diameter. You would not compare the 9 strand rope to an 8 strand rope with a different diameter because any differences between the ropes could be attributed to the difference in diameter. Similarly, any differences between the ropes designed by BBRG could be attributable to the difference in tensile strength. BBRG could have selected a tensile strength that was consistent across all of its three ropes. The fact that it chose a different tensile strength for its 6 strand rope is further evidence of undue manipulation of rope design parameters within its software. There is strong reason to suspect that BBRG has manipulated its rope design parameters to yield predictions favourable to BBRG's case.

As we have seen, BBRG uses one set of spinning losses in its software, and another set in its mathematical equation, neither of which match the spinning loss applicable to our clients' 9 strand wire rope. We have also uncovered another instance of BBRG unduly manipulating the rope design parameters in its own software.

After all of BBRG's invalid estimations of fill factor and breaking force, made with the help of manipulated software and an inapplicable mathematical equation, BBRG pulls the following conclusions out of thin air:

*It is evident therefore that an increased strength does not extend the useful life of the rope and the increased fill factor does not contribute to an increased strength in the rope.*

From where has BBRG drawn these conclusions? How are these conclusions evident? Indeed, these conclusions reveal yet another self-contradiction. On page 3 of its submission, BBRG asserts that "*strength of rope can also be achieved by other means...such as compacting to increase fill factor*". And now, on page 7 of its submission, BBRG claims that it is evident that "*increased fill factor does not contribute to an increased strength in the rope*".

## **G Rope life is important, however achieved**

On page 3 of BBRG's submission, it is asserted that "*MBL is not the defining factor in rope life*". On page 7, it is asserted that "*[f]lexibility is not the defining factor in rope life*".

Firstly, our clients have never maintained that MBL or flexibility are defining factors in rope life.

Secondly, it is unclear what the purpose of these assertions even are. Is BBRG implying that there is a defining factor in rope life, but that it is neither MBL nor flexibility? As should be abundantly clear by now, wire rope is a complex technology and rope life is affected by a combination of a whole range of factors.

BBRG goes on to state that some customers use ropes with reduced flexibility. It is unclear what the purpose of this statement is. Of course some customers choose stiffer ropes. It is our clients'

contention that wire ropes are highly specialised products which are designed and fit for purpose. Some applications benefit from more flexible ropes, and some applications benefit from stiffer ropes.

BBRG's vacuous observations about flexibility do not change the fact that our clients' 9 strand wire rope offers greater flexibility. As such, our clients' 9 strand wire rope will outperform stiffer 6 and 8 strand ropes in applications demanding flexibility.

BBRG then states that kinking can happen to 6, 8 and 9 strand ropes. Again, it is unclear what the purpose of this statement is. Our clients' 9 strand rope is not immune to kinking, and they have not claimed it to be. However, by virtue of the 9 strand rope being more flexible, it is less likely to kink as a result of inadequate installation procedures.

## H Misquoting of Australian Standards

BBRG refers to Table 14.4.1 of an Australian Standard as a guide for when wire ropes should be discarded.

For the Commission's reference, Table 14.4.1 is from Australian Standards AS 2759 - 2004, not AS3569 as BBRG claims.

Firstly, BBRG's use of and reliance on Table 14.4.1 is disingenuous and self-contradictory. BBRG asserts that based on the table, 6x49 wire ropes should be discarded when nine wires are broken in one rope lay. However, BBRG recommends to its own customers that 6x49 wire ropes should be discarded when a maximum of 30 wires are broken in one rope lay. **[CONFIDENTIAL TEXT DELETED – evidence regarding the foregoing sentence]**

**[CONFIDENTIAL TEXT DELETED – pictorial evidence re the foregoing sentence]**

Secondly, Table 14.4.1 does not even apply to 9 strand wire ropes (much like the mathematical equation that was misused by BBRG, as per F above). Table 14.4.1 specifies when ropes of certain constructions ought to be discarded, and considers ropes with 4, 6, 8, 18 and 34 strands. The table says nothing about ropes with 9 strands, and yet BBRG happily pretends that it can be relied upon to draw relevant conclusions.

The fact that the previous mathematical equation and Table 14.4.1 can be applied to 6 and 8 strand wire ropes but not 9 strand ropes itself highlights the fact that 9 strand wire rope is a fundamentally different product. BBRG's inability to ascertain any equations or tables relevant to 9 strand is further evidence still that 9 strand wire rope stands in a product category of its own. It is a new product.

## I Inaccurate claims about fatigue resistance

BBRG makes a range of inaccurate claims regarding fatigue resistance.

Firstly, BBRG's assertion that the 9 strand wire rope would be less fatigue resistant than 6 and 8 strand wire ropes is based on its own rope designs and software predictions which we have already shown do not reflect our clients' actual ropes.

Secondly, the "*strand metallic area as % of total Rope area*" figures provided by BBRG are wrong. They do not even correspond with its own rope designs, let alone our clients'. Recall from page 3 of BBRG's submission that "*fill factor is defined as the metallic area contained within a circle of the overall rope diameter*". As such, "*strand metallic area as % of total Rope area*" should be extremely similar, if not virtually identical, to fill factor. This is not the case from BBRG's predictions, as shown by the below comparison:

|                 | 83mm 6 x 49 | 83mm 8 x 36 | 83mm 9 x 31 |
|-----------------|-------------|-------------|-------------|
| Fill Factor (%) | 65.9        | 63.4        | 63.1        |

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As compared to:

|                                              | 83mm 6 x 49 | 83mm 8 x 36 | 83mm 9 x 31 |
|----------------------------------------------|-------------|-------------|-------------|
| Strand Metallic area as % of total Rope area | 87          | 75          | 70          |

BBRG's arguments regarding fatigue are based on these fabricated "*strand metallic area as % of total Rope area*" figures. BBRG may have conjured up these figures by dividing the cross sectional area of only the outer strands of its rope designs by the corresponding total metallic cross sectional areas. Such a calculation does not yield "*strand metallic area as a % of total Rope area*", as BBRG alleges, and it completely and artificially neglects the strand metallic area of the independent wire rope core ("IWRC"), which is of even greater importance in 9 strand wire ropes given the IWRC's increased size and load-carrying capacity.

Thirdly, as already discussed, our clients' 9 strand wire rope has a greater fill factor, and thus a greater "*strand metallic area as a % of total Rope area*". Consequently, under the same loading, the wires and strands of our clients' 9 strand wire rope are less stressed, and thus the rope is more fatigue resistant. BBRG itself acknowledges that:

- "*It is natural for the core to be larger for a given rope diameter when the number of outside rope strands increase*"; and
- "*It is well known the strands carry the bulk of the load in a wire rope*".

Consistent with these acknowledged facts, our clients' 9 strand rope indeed has a larger load-carrying core which results in a more fatigue resistant rope (it must be borne in mind that the IWRC of our clients' 9 strand wire ropes is composed of strands).

In contrast to BBRG's misrepresentative software-based predictions, our clients' 9 strand rope has a greater fill factor and greater strand metallic area. As such, the individual wires of the rope experience less stress, not more.

## **J Rope trials**

As conceded by BBRG, 9 strand wire rope had never previously been "*used in any surface mining activities in Australia*". Indeed, the hoist rope example referred to by BBRG was the first time our clients' 9 strand rope had ever been used at that mine. This usage was a trial run, and again underlines the novelty of our clients' 9 strand product.

Further, BBRG's claims - that our clients' 9 strand hoist ropes remove less BCMs than BBRG's ropes, and that our clients' drag ropes have a lower life than its 6 and 8 strand drag ropes - indicate that it just cannot understand the frame of reference for this inquiry. BBRG goes to great lengths to pillory our clients' product. If our clients' product is in truth so bad, compared to BBRG's, then BBRG would have established the contrary proposition to that of its application. We note that the one thing that BBRG never says is that the products are the same. In that respect, at least, BBRG is correct.

## **K BBRG's claims about manufacturing time are uninformed and incorrect**

Our clients have already disclosed how much additional time it takes to manufacture 9 strand wire rope. It is rather bizarre then that BBRG would venture a guess as to how much longer it would take, given that BBRG presently does not and cannot produce 9 strand wire rope.

Indeed, if 9 strand wire rope actually was "easy" to produce, and could be produced without research and development and machine retooling, then surely BBRG would have produced its own 9 strand wire rope to determine the rope's actual physical properties, rather than resorting to its own software models and erroneously applied equations and tables.

**L Our clients' marketing material is not misleading**

BBRG asserts that our clients' marketing material is misleading. BBRG's assertions are false.

- Our clients' 9 strand rope delivers improved wear and fatigue endurance.
- Rovings are optional. The marketing material itself says that the rovings are "*design enhancements*".
- **[CONFIDENTIAL TEXT DELETED – product development]**

**M Customers using 9 strand would use up old stock first**

BBRG alleges that a certain mine viewed the change to 9 strand rope as "*so minor that they consumed their entire 6 and 8 strand Haggie rope before starting to use 9 strand rope*". This attempt to claim that the mine saw the differences as minor because they used up old stock before commencing to use the new product is fatuous in the extreme. To use up old stock is a completely sensible decision. The mine has already purchased our clients' 6 and 8 strand ropes to use. Why would the mine make the wasteful decision to discard them?

Indeed, BBRG argues against itself by citing this example. If the products were the same or only a slight modification then a customer would not need to run down its existing 6 and 8 strand stock. Instead, it would use the old stock and the new stock interchangeably. But, on BBRG's say-so, that is not what this customer did.

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The foregoing is highly critical of BBRG's submission. However we do not resile from those criticisms because our clients' replies are entirely appropriate and accurate. We have the advantage of defending our clients in a fact situation that manifestly proves that our clients' 9 strand wire rope does not constitute a slight modification.

We ask the Commission to correctly consider the facts and to give the Minister a report recommending that the original notice remain unaltered.

Yours sincerely



**Daniel Moulis**  
Partner Director