



## FACTSHEET 007 – AVERAGING PERFORMANCE

### Background

Contractor performance in a Performance Based Contract (PBC) can be calculated using the concepts of Achieved Performance and Adjusted Performance Score (APS). As shown in Figure 1, this technique takes Contractor performance in the unit of measure (e.g. days, number of defects, etc.) (the **Achieved Performance**) and converts it to a percentage representing the value delivered to the CASG (the **Adjusted Performance Score (APS)**).

In addition to the Achieved Performance and APS, PBCs also score the Contractors performance based on one of four Performance Bands represented by **Performance Bands A** through **D** as illustrated in Figure 1. While these Performance Bands are not linked to payment, they are linked to other contract rewards and remedies such the determination for contract extension (i.e. Award Term / Rolling Wave) and/or Stop Payment and Contractor Termination for Default.

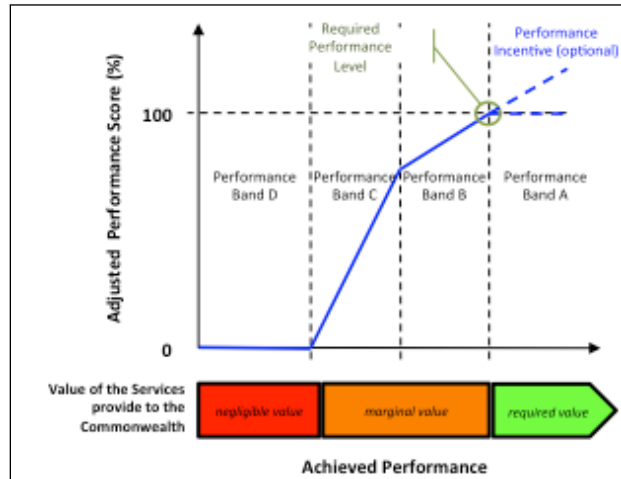


Figure 1: Performance Curve

In calculating the Contractor's Achieved Performance and APS for a Review Period, which can range from 1 month to 1 year, each individual performance measure needs to include a method for taking into account multiple timeframes (e.g. days in a month), multiple events in a time period (e.g. number of deliveries in a day) or even multiple events in multiple timeframes (e.g. a number of repairs in a single day, and then those days in a month).

So how do you choose an appropriate averaging approach?

### Scope of Factsheet

The intent of this factsheet is to provide guidance to the PBC practitioner on:

- range of averaging approaches; and
- advantages and disadvantages of each averaging approach;

thereby allowing the practitioner to choose the appropriate averaging approach for their contract.

### Performance Measure Averaging Approaches in Performance Based Contracting

There are 4 types of performance measure averaging used in PBCs:

1. Type 1 - Achieved Performance averaging (**Input Average**);
2. Type 2 - Adjusted Performance averaging (**Output Average**);
3. Type 3 - Minimum value; and
4. Type 4 -Maximum value.



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### **PBC Averaging Type 1 - Achieved Performance Averaging (Input Average)**

The Type 1 averaging approach, a simple mathematical average or mean of all the Achieved Performance values in the Review Period, is the most common as it is the default position of most PBC practitioners. Here the equation is simply:

$$\text{Avg Achieved Performance} = \frac{\text{total score for all events (or timeframe (e.g. days))}}{\text{number of events (or timeframe)}}$$

The Review Period APS is then simply calculated from this average Achieved Performance.

The CASG PBC CoE refers to this approach as **Input Averaging** since it uses the average of the Contractor's Achieved Performance (input) to create an average for the Review Period. While this approach is easy to understand and simple to use, it may, depending on the payment curve (i.e. the relationship between the Achieved Performance and the APS), mask poor performance by treating the value received by the CASG for all events equally.

### **PBC Averaging Type 2 – Average Adjusted Performance Score (Output Averaging)**

The less common approach to the averaging of the APS over the Review Period is to treat each event (or timeframe) against the Performance Curve shown in Figure 1. That is to calculate the APS for each event resulting in what the PBC CoE refers to as **Output Averaging**.

In this approach the APS for the Review Period is based on an average of individual APS corresponding to each event or timeframe as shown in the following equation.

$$\text{Average APS} = \frac{\text{total APS for all events (or timeframe (e.g. days))}}{\text{number of events (or timeframe)}}$$

As discussed above, the APS (as opposed to the Achieved Performance) reflects the 'value' delivered to the CASG and the warfighter for each event or timeframe. Accordingly, by averaging all the APS that occur during the Review Period by the Output Averaging approach is more representative of the average 'value' delivered to the CASG and the warfighter over the Review Period.

The disadvantage of the Output Averaging approach is that it is more complex to apply since it requires multiple calculations of APS (rather than one per Review Period) and also requires a method for assigning Performance Bands where the average Achieved Performance are traditionally used.

### **PBC Averaging Type 3 and 4 – Minimum / Maximum Average of the Achieved Performance**

An alternate to both the Type 1 and Type 2 averaging approach, although less common, is the Minimum / Maximum approach. This approach calculates the average Review Period Achieved Performance on either the minimum or maximum of the daily Achieved Performance score observed during the Review Period. While its advantages are that it is simple to apply and easy to understand, the major disadvantage is the impact on Contractor motivation if the minimum or maximum score is delivered on the first day. What incentive is there for the Contractor to deliver better / continued performance during the remaining timeframe?

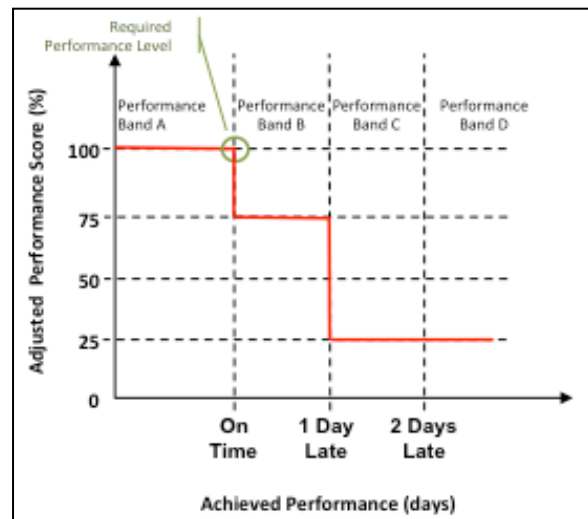


**Worked Example**

To assist in understanding the differences consider the following example.

A Contractor is required to deliver a product to the buyer on-time, every-time. The measure is simply the number of days late between the contracted delivery date and the actual delivery date. In this case the relationship between performance and payment is represented as follows:

- delivery on-time (e.g. 0 days late) or early results in 100% payment
- delivery 1 day late results in 75% payment
- delivery 2 days late or greater results in 25% payment



**Figure 2: Example Performance Curve**

An illustration of the corresponding Performance Curve is provided in Figure 2.

So consider a single day with 3 deliveries, the first delivery being on-time (i.e. 0 days late), the second being 1 day late and the third being 2 days late.

Based on this example the Input Averaging approach would result in a final score of 1 day late based on the simple mathematical average of the delivery times (e.g. 0 days + 1 day + 2 days divided by 3 deliveries) resulting in a 75% payment.

The Minimum Averaging approach would result in an "average" of 0 days and 100% payment while the Maximum Averaging approach would result in an "average" of 2 days and 25% payment.

Finally, the Output Averaging approach would be the average of the payment score for each delivery in the day, in this case resulting in payment of 66.7% based on 100% + 75% + 25% divided by the 3 deliveries.

A summary of the Achieved Performance and APS for each of the averaging approaches is provided in Table 1.

| Delivery 1 | Delivery 2 | Delivery 3  | Type 1 - Input Avg       | Type 2 - Output Avg      | Type 3 - Min Avg          | Type 4 - Output Avg      |
|------------|------------|-------------|--------------------------|--------------------------|---------------------------|--------------------------|
| On-time    | 1 day late | 2 days late | Ach = 1 day<br>APS = 75% | Ach = n/a<br>APS = 66.7% | Ach = 0 days<br>APS = 25% | Ach = n/a<br>APS = 66.7% |

**Table 1: Summary of Achieved Performance and APS**

So how do you choose the best approach? The choice should best balance simplicity of the approach with the commercial protections required by the CASG.



### Combining Averaging Approaches

There are specific circumstances where you would combine the approaches. For example, you could use the Minimum / Maximum Averaging for a range of events (e.g. minimum quantities held by a Contractor over a range of items or products) on a single day, but then use Input / Output Averaging for all days within a month.

This combined approach can provide a good balance of protection to the CASG and simplicity, but also fairness to the Contractor.

### Summary

In summary there are 4 types of averaging used in a PBC:

- Achieved Performance averaging (**Input Average**);
- Adjusted Performance Score (APS) averaging (**Output Average**);
- Minimum value; and
- Maximum value.

Each approach to averaging contractor performance has its own advantages and disadvantages that should be considered when developing your performance measure. A summary of these is provided in Table 2.

However, in certain circumstances a combination of performance measure averaging techniques should be considered.

|               | Type 1  | Type 2  | Type 3   | Type 4   |
|---------------|---|---|--|--|
| Advantages    | <ol style="list-style-type: none"> <li>1. Simple to apply</li> <li>2. Easy to understand</li> </ol>                   | <ol style="list-style-type: none"> <li>1. More representative of the average 'value' delivered to the customer</li> </ol>                 | <ol style="list-style-type: none"> <li>1. Simple to apply</li> <li>2. Easy to understand</li> </ol>  | <ol style="list-style-type: none"> <li>1. Simple to apply</li> <li>2. Easy to understand</li> </ol>  |
| Disadvantages | <ol style="list-style-type: none"> <li>1. Can mask poor performance</li> <li>2. All events treated equally</li> </ol> | <ol style="list-style-type: none"> <li>1. More complex to apply</li> <li>2. Harder to establish 'bands' for other consequences</li> </ol> | <ol style="list-style-type: none"> <li>1. If the minimum score is delivered on the first day, the Contractor has limited incentive to deliver better performance during the timeframe</li> </ol> | <ol style="list-style-type: none"> <li>1. If the maximum score is delivered on the first day, the Contractor has limited incentive to continue delivering this level of performance during the timeframe.</li> </ol> |

**Table 2: Summary of Advantages and Disadvantages of Averaging Performance Approaches**