Chapter 17: Baseline Compliance Analysis

The Baseline Compliance metric provides important data on the progress of an ongoing schedule in relation to its original/baseline plan. There are several metrics in baseline compliance which helps create 2 key performance indicators, baseline compliance performance and baseline compliance variance, these KPIs provides the insight on the deviation of the current schedule from its baseline. There are 2 types of analysis in baseline compliance, descriptive compliance, and predictive compliance, as the terms says itself, descriptive compliance helps understanding the performance of actual work done in terms of starting and or finishing the work, early, on time or late. Similarly predictive compliance forecast the impact of remaining scope in terms of to be started and or to be finished, early, on time or late.

In baseline compliance analysis, schedulers need to have a comparison of baseline dates with the current dates, here we do not require earned value metrics to judge the performance of current schedule. As rule of performance measurement, we first need to set the performance measurement baseline, in doing so, we need to decide what baseline dates we will set as PMB. This tool is developed using baseline early start and early finish dates as a measurement criteria. Using baseline late start and finish is highly risk to use as KPI, because there are lots of activities with floats that create separation of early and late dates, so if your current dates are laying in between baseline early and late dates, and your measurement criteria was BL late dates, so the system will consider it to be done earlier than baseline late dates, but in reality you have done the work after early dates which will eat up the float without flagging the baseline compliance issues.

Now consider having baseline compliance with early dates, the biggest benefit is, even if you start or finish the activities 1 day after the early dates but before late dates, the KPIs will show it as late stare, because you could not meet the early BL dates, which means some part of float is being consumed but without delaying the project. It is obvious that for critical task, starting or finishing the task 1 day after the early dates means delaying the task by 1 day because early and late dates are same for critical task, so there is no margin of baseline compliance variance in critical tasks unlike the non-critical task.

The metrics we use in baseline compliance analysis are given below, these metrics are of two types, descriptive and predictive, the predictive metrics are derived from the performance of descriptive metrics, for example if the descriptive baseline compliance performance is poor, then the impact of these metrics will be faced by predictive metrics, higher the variance in descriptive baseline compliance, lower will be the predictive compliance performance and greater will be the predictive compliance variance. Compliance of a baseline is assessed in two categories, compliance of baseline start dates and compliance of baseline finish dates, both are monitored separately and both of them give the qualitative assessment, their KPIs “Compliance Performance” and “Compliance Variance” are Percent, and they show extent of sticking to the plan vs degree of deviation from the plan in terms of descriptive analysis, when predictive

analysis comes, these Percent show, expected compliance performance and variance of remaining part of the schedule.

Following are the metrics used in baseline compliance analysis, the formula and explanation of their Percent is given in definition chapter.

Descriptive Metrics:

- Started Early: Started at least one day before BL early start
- Started on Time: Started on same day of BL early start
- Finished Early: Finished at least one day before BL early finish
- Finished on Time: Finished on same day of BL early finish
- Started Late: Started at least one day after BL early start
- Finished Late: Finished at least one day after BL early finish

Predictive Metrics:

- To Start Early: Current start at least one day before BL early start
- To Start on Time: Current start on same day of BL early start
- To Finish Early: Current finish at least one day before BL early finish
- To Finish on Time: Current Finish on same day of BL early finish
- To Start Late: Current start at least one day after BL early start
- To Finish Late: Current finish at least one day after BL early finish

Descriptive KPIs:

- BL Compliance Performance (Start) = (SE + SOT) / Total Task
- BL Compliance Performance (Finish) = (FE + FOT) / Total Task
- BL Compliance Variance (Start) = SL / Total Task
- BL Compliance Variance (Finish) = FL / Total Task

Predictive KPIs:

- BL Compliance Performance (Start) = (TSE + TSOT) / Total Task
- BL Compliance Performance (Finish) = (TFE + TFOT) / Total Task
- BL Compliance Variance (Start) = TSL / Total Task
- BL Compliance Variance (Finish) = TFL / Total Task

Above KPIs show the quality at which compliance performance was achieved and expected to be achieved but they do not quantify the magnitude of poor compliance, for example a task exceeding 1 day from early dates will be flagged as compliance variance just like a task exceeding by 10 days, because the criterion of compliance is, exceeding the early dates even by one day, so in order to understand the magnitude of poor descriptive compliance and its impact in predictive compliance we need to investigate in depth, investigation can be done at activity level and figure out the root causes, but at higher level understanding we can quantify the

impact of predictive compliance by introducing float consumption which is discussed in details in chapter 18 float risk analysis.

Schedulers know, just like, every baseline have a critical path, similarly they also have available total float in the schedule, and it is almost certain that these floats will be consumed sooner or later, by definition if current start or finish dates are exceeding from baseline early start and finish dates, that means float will be consumed and the allowable limit to utilize the available float is, until it reaches to zero, and after that float will turn into negative float and task/project will get delayed. So, if the activities are exceeding early dates and falling into category of poor compliance "compliance variance", in parallel they are consuming the available float. We can develop the tabulation and trend of float consumption and compare it against baseline total float this way we can have great insight of remaining part of schedule as far as compliance to baseline is concern. Following are the metrics of float consumption analysis

- Baseline Total Float
- Total Float (current project)
- Float Consumption (BLTF – TF)
- Float Consumption % = Float Consumption / Baseline Total Float

Float consumption is the difference of available float in baseline vs available float as of current update whereas float consumption % is the percent of baseline float that has been consumed, for example if BL TF was 100 days and current TF is 50 days, then float consumption percent will be 50%. That means 50% of baseline total float has been consumed. There is no such standard to restrict or authorize the consumption of float, but a threshold limit can be set, which upon breeching, can warrant for investigation of poor performance, before all the float ion the project is eaten out.

Before we head towards analyzing the data, we need to understand how baseline compliance analysis actually works. When we speak about descriptive and predictive compliance performance, we deal with timeline of schedule, the maximum span of timeline can be from kick off till last day of the project and minimum time span can be from last update of the schedule till the project finish day. Everything behind the time now, will be descriptive and ahead of it, will be predictive. It is most certain that the impact of descriptive performance will either pull current dates towards time now (data date) or it will push them away from data date, in both the cases, current dates will be different from baseline dates, for example, the baseline early finish was in January, but due to poor performance of descriptive compliance, the current early finish is now in February, in such cases the expected performance of predictive compliance (previously January now February) will appear in the month of February not in January, because the principals of baseline compliance is based on current finish or start dates not the baseline dates. As there is a possibility that, a task may start in one month and finish in another, so in that case we have to choose either to consider the compliance performance based on current start or current finish dates, because an activity cannot fall in two different time scale, it has to be either its finish period or the starting period. Current finish period is always the better choice, and the same mechanism is used in this tool.

Float consumption is most certain thing in any project across the globe, it is nearly impossible to start and finish the task in exactly the same order and same dates as planned in baseline. A single day of deviation from baseline early dates results in consumption of float, which eventually results in baseline compliance variance, by this understanding we can say that float consumption is inversely proportional to baseline compliance performance, and directly proportional to baseline compliance variance. As we discussed earlier that there is no specific rule of thumb for setting the flag in baseline compliance performance. Although it is a subjective analysis, but we can establish a reasonable range to set the threshold limit for compliance performance and variance. Let's discuss few scenarios before we discuss threshold limits. If a schedule has 95% compliance performance and only 5% compliance variance that means as of current period only 5% tasks in the schedule are exceeding the baseline early start and or finish dates, which also means that only 5% tasks consumed some part of their available floats, by what margin? We don't know yet for that we need to drill down and look into float consumption. So, in order to set a reasonable threshold limit, it is advisable to keep threshold between 75 and 100 instead 90 and 100. Because we know that 75% compliance performance does not mean that the schedule is delayed, it only means 25% task are not finishing on or before early dates, they might be finishing way earlier than late dates, so keeping that scenario in mind it is recommended to flag compliance performance for all those periods where compliance performance % is less than 75%

Let's analyze baseline compliance metrics and understand the visuals. In picture 17.1 we have selected Update 3, here we can see in the table that, project time scale is used in columns and baseline compliance metrics in the rows. The metrics and KPIs on the left side of data date are descriptive and from right side of data date until the end of the project it shows predictive metrics and KPIs. These rows are highlighted based on minimum to maximum values for both descriptive and predictive data. Schedulers can see from the heat map which months of the schedule are risky in terms of variance to baseline dates and float consumption. It is logical that float consumption is a predictive metric similar to total float because there is no float for the work that has been done. Float consumption and its percent are the values, for example float consumption in 2015 march is 41.90%, that means 42% of baseline float for the month of march has been consumed in as is condition, it also means that, if things go unchanged in the project from now onwards, then in the month of march we will end up by consuming 42% float. March is left on average by 68% of baseline total float. Ideally float consumption should be as minimum as possible, but in case we are continuously losing the baseline float, then we can use this metric to foresee the risk of float to be eaten out.

Picture 17.2 is a trend analysis of performance and variance of start and finish side by side, this trend give a quick view to observe gaps between start and finish for both performance and variance, by this schedulers can analyze where the issue is coming from, and in which period start, and finish are following similar pattern and where they deviate from each other. The pie and donut charts show over all descriptive and predictive metrics. As per update 3, in donut

chart of descriptive start compliance, we can see 397 (80.69%) task started late, for sure these late starts will leave their impact on remaining works which will cause variance to compliance and float consumption, this can be seen in pie chart of predictive start compliance, where 2786 (88.39%) tasks are expected to start late. In descriptive finish compliance, we have finished 79.19% task late and expected to finish 88.54% late in future. Overall start compliance performance (descriptive + predictive) is only 12.65%, whereas finish compliance performance (descriptive + predictive) is 12.35%, which give average compliance performance of 12.50%. Average compliance variance is 87.5% which can also be seen in the line chart, where the trend is above 80% in majority of the months.

As of update 3 we can see the float consumption (a predictive value) has already reached to 41.42% that means as of current update, we are expected to consume 41.42% float, and that could be the issue, in order to analyze the consequence of 41.42% float consumption, we must associate remaining duration% with float consumption% and classify the level of risk involved in float of each task. Next chapter will discuss about float risk analysis and the required metrics and KPIs.