HYBRID PROJECT PLANNING AND CONTROL MODELS

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Abstract: The analysis of project planning methods, Gantt chart, Cyclogram, matrix and network chart, their advantages and disadvantages generated the hypothesis that it may be a new model that would lack the disadvantages of the Network Matrix and Chart. The Gantt Chart and the Cyclogram are simple models and are applied after the optimizations made with the help of the Matrix and the Network Chart. The Matrix has the great advantage of solving the problem of optimizing the order of inclusion of sectors in the chain and in this way, of reducing the duration of projects with non-rhythmic processes by 20-25%.

The Matrix does not explicitly reflect the technological and organizational conditions between activities and is a difficult model to formalize for the automated calculation of resources. The Network chart reflects these dependencies and can be used for automated resource planning, including time. For the planning of projects with non-rhythmic chains, a hybrid planning model based on the Matrix and the Network Graph is examined. The model has the advantages of the Matrix, namely the possibility of reducing the critical path based on determining the optimal combination of inclusion of sectors in the chain. The model has the advantage of the Network Chart to perform computer-assisted resource allocation and control. The effectiveness of the models is demonstrated by simulating the durations of the activities. The procedures for calculating the Network Chart necessarily provide for fictitious activities. This is a disadvantage of the Network Chart because it increases the volume and complexity of the calculations and requires additional time to master the algorithm. It is demonstrated that the hybrid model can be developed without fictitious activities using the Network Graph with information about node activities. The new model is called MAG, Matrix and Network Graph. The formulas for calculating the time parameters, including the critical path, are reflected. Examples are provided for calculating projects with non-rhythmic processes in at least two sectors.

Keywords: Project planning tools, Gantt chart, Cyclogram, Matrix, Network chart, critical path, time reserve, minimum and maximum start time, minimum and maximum completion time, hybrid model, MAG chart, fictitious activity, duration execution.