

creative approaches to project planning and lead to improved costing, bidding, and contracting procedures.

ELEMENTS OF DELTA CHARTS

DELTA is an acronym that represents five of the seven kinds of graphic symbols employed on the chart. These are decision box, event box, logic box, time arrow, and activity box. The sixth symbol, the connection matrix, is used in depicting a large fanout of activities. The seventh symbol is that of a ground or earth termination, which is common in electrical-circuit diagrams. It is used to denote the termination of a sequence of preceding elements.

The seven distinctive symbols in their most basic form are illustrated in Fig. 1. In this form, the symbols can be used in presenting an overall program concept without cluttering the DELTA chart with time information and codes that relate specific activities, events, and decisions to other parts of a program plan.

As with most networks, DELTA charts incorporate events and activities. In practice, these two elements often do not comply to a precise syntax with resulting fuzzy definition and confusion. To avoid these problems, both events and activities have been given a precise syntax. An *event* is structured as a noun or object followed by a verb or action phase such as "report complete." An *activity* is composed of an active verb followed by an object word or phrase plus constraints.¹ Examples of events and activities that illustrate this syntax are shown in Fig. 2 and 3, respectively.

A *decision* is defined as a choice among several alternatives. Ordinarily, three at most can be shown conveniently, but one may show others at the expense of warping the decision box. The decision maker's title is written in the decision box.

A logic box contains logic copula, such as AND or OR. The AND box may appear at either the input or output of an event or activity box. If used at the input, all of the activities, events, or decisions feeding into the AND must be realized before the subsequent activity can be started or the subsequent event can occur. Similarly, all activities, events, or decisions connected to an AND at the output of an activity or event box must be carried out or occur. The AND box may also be used as a junction point to gather together the output of activities, events, and decisions that have occurred and then to fan them out to subsequent activities, events, and decisions.

The OR function, as it is usually used in DELTA charts, is to be interpreted as an "exclusive-or." That is, one and only one of the activities, events, or decisions feeding an OR box can be realized at a given time. The OR box has only a single output.

In contrast to most network methods, the lines that join the various boxes represent only the flow of time, except at the output of a decision box where the lines also represent the decisions. In most networks, the lines represent activities that are carried out over a period of time.

¹ Consistent with the above syntactical scheme, an objective is structured as the infinitive form of a verb followed by an object word or phrase plus constraints, for example, "to apply science for the benefit of mankind."

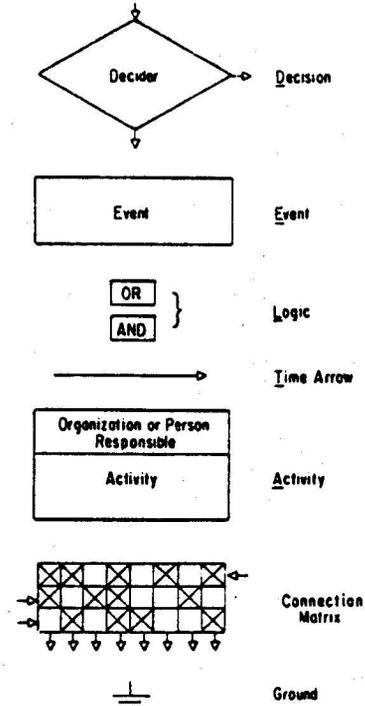


Fig. 1. Symbols for DELTA charts (first level of complexity).

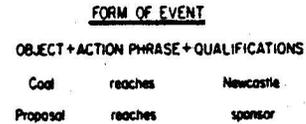


Fig. 2. Form of event with examples.

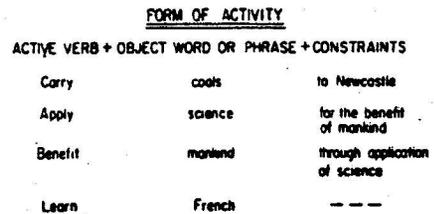


Fig. 3. Form of activity with examples.

In order to relate decisions, events, and activities to complete descriptions of these elements in a project plan, provision is made for incorporating an identifying code within each of the corresponding DELTA chart symbols. This second level of symbol complexity is illustrated in Fig. 4. As is discussed later, DELTA charts are often used in conjunction with Gantt charts. The latter presents in more detail the graphic presentation of the time sequence of the elements. The identifying code is then the means of interrelating these two charts.

As seen from Fig. 5, which illustrates the third and most complex level of DELTA chart symbology, the scheduled dates for decisions, events, and activity durations are incorporated within the corresponding symbols.

An event, defined previously as a noun or object followed by a verb or action phrase, is portrayed by a box that is divided into three parts. In the large upper portion, the event