

## 5.1. Planning Phase

In general, and in a simple way, design process is carried out with the following phases (see Topic 3):

- **Product Planning and Clarification Phase:** it requires information about the product demand and the generation of early ideas. As a result of this phase, we will have a detailed list of the demands.
- **Conceptual Design Phase** implies the following: an exercise of abstraction in order to detect the basic problems, forming functional structures, defining the first steps of the work, finding the working principles, combining those working principles in the functional structures, finding a suitable structure for working and developing the main solution, or at least, the beginning of a solution.
- **Assembly Design Phase.** In this phase, starting from the concepts defined in the Conceptual Design Phase, the designer works out a definitive distribution of the proposed system, or at least, a proposed system that matches the technical and economic specifications. This distribution permits to verify characteristics as functionality, force, spatial unity, etc. At the end of this phase an evaluation of the economic viability must be possible.
- **Detail Design Phase** that corresponds to manufacturing plane and the last details.

It is convenient that the design phases overlap in time, so that, some parts of the different phases happen at the same time. The main goal is to reduce the time employed in the design process by means of a better integration of the different activities, which permits to add results obtained in a phase to the next one.

The total time for the design process depends on the complexity of the product or system proposed. The next table shows a generic timeline of the design process.

PHASE	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Planning										
Conceptual Design										
Assembly Design										
Detail Design										

5.1 Table: Timeline

A given problem will be well structured if the goal and objectives are defined beyond all doubt, the number of options is defined and limited and there is a solution algorithm. Certainly, this is the ideal situation, but not always the real one, but we must try to approach it as much as possible.

### 5.1.1. Information management

One of the most important aspects in the Planning phase is the searching and management of information about the project.

1. Looking for information in documents related with the project: magazines, catalogues, specialized bibliography, standards and industrial exhibitions.
2. Try to classify as much information as you can.
3. Select the information. All the information is not useful, so you must fix some criterion: groups of different products, lifetime and grade of innovation...
4. Summarize the selected information. It is advisable to condense and summe up the information using computers..
5. Evaluate the information: select the information according to reliability, using objective data, reliable sources...
6. Encoding the information simplifies the searching, for example, using lists.
7. Save the information. After being classified, you can generate files, data bases...
8. Send the information. When working in a team, you must make sure the there is information exchange.
9. Work out the conclusions. There cross-information will be used in the design process to define the problem, generate alternatives, to evaluate...