AECMA

ASSOCIATION EUROPEENNE
DES CONSTRUCTEURS
DE MATERIEL AEROSPATIAL

Définition d'une Terminologie des Coûts des Avions pour Utilisation dans l'Etablissement des Prix

Definition of an Aircraft Cost Terminology for use in Aircraft Pricing

Definition einer Kostenterminologie zur Verwendung bei der Flugzeugpreisermittlung

RECOMMANDATION N°: Eco / CTI / 3691

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DEFINITION OF AN AIRCRAFT COST TERMINOLOGY FOR USE IN AIRCRAFT PRICING

February 1974

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Section 1 - INTRODUCTION

1.1. The aim of this paper is to provide a framework of the activities and expenses that occur during the life of an aircraft and which it is necessary to take account of when preparing estimates of cost and when pricing. With this in view it has been considered expedient to standardise the grouping of such activities and expenses into "Stages". It must, however, be emphasised that this grouping only provides a convenient way of defining "packages of work" and there is no intention to imply that the timing of work under these "Stages" is carried out, in practice, in a sequential fashion. This question of timing is enlarged upon under 1.3 of this paper.

1.2. The definitions of each of the basic stages adopted in this paper are as follows:-

(i) Development Stage: includes the design of the Aircraft, the building of aircraft used in flight testing, the manufacture of Test Articles and their testing and terminating with the completion of flight testing of these aircraft and the granting of a Certificate of Airworthiness or its military equivalent.

(ii) Industrialisation Stage: comprising the setting up of the specific to type industrial investment required for the production of the Aircraft to the standard at certification. Work under this stage will cease when the setting up has been completed and the maintenance of tooling commences under the Production Stage.

(iii) Production Stage: covering the building and acceptance by the customer of the series production aircraft.

(iv) Exploitation Stage: concerning the commercial or military operation of the aircraft after delivery.

Having defined the basic stages, an analysis has been made of each individual area of activity or expense thus providing a detailed definition of each stage. These individual stage definitions are given at Sections 2 to 5 inclusive.

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1.3. As stated at 1.1. above whilst these stages have been specifically defined it will be apparent that they do not necessarily follow each other at particular instances in time and that on many projects some stages will overlap or merge into each other. For example, an extremely high technology Aircraft breaking new ground, e.g. S.S.T. or S.T.O.L. is likely to have a Development Stage with prototype aircraft being built and evaluated with a very clear cut-off point before the Industrialisation and Production Stages are initiated. On the other hand, in the case of an Aircraft involving a lower degree of complexity there may be no prototype aircraft and the aircraft used for the flight testing will be almost fully representative of the series production model. In this case the Industrialisation and Production Stages are likely to commence relatively early and well before the completion of development; the degree of risk in the possibility of abortive effort being outweighed by the reduction in time of delivery of series production aircraft. Although this aspect of timing must be borne in mind it is, nevertheless, a fact that certain work has to be carried out no matter when it takes place and, therefore, for the purpose of this paper the line has been taken that activity on all aircraft projects will comprise the four stages described at 1.2.

1.4. In considering the individual headings under each stage the work has been defined in terms of "costs" but under Section 6 of the paper these "costs" are brought together and used to produce various definitions of aircraft "prices". The principle adopted to differentiate between "cost" and "price" is that "cost" represents the manufacturer's expenditure in the outlay of time, labour, money to purchase materials, equipment services etc. and "price" represents money for which the product is sold by the manufacturer.

References to "cost" in this paper do not necessarily relate to actual recorded expenditure but may comprise estimates of such expenditure.

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1.5. Under Section 6 the aircraft "prices"are defined in particular ways dependent on the amount of help the manufacturer is receiving from his Government with the expenses of the Development and Industrialisation Stages.

In some cases the manufacturer may be paid these expenses in full, in others the Government may share the expenses and lastly the manufacturer may bear all the expenses himself. The way in which the expenses are handled will often depend on whether the aircraft is a civil or military project but the definitions given are intended to provide a basis to meet the requirements of both.

1.6. To elaborate the point some typical ways by which Development and Industrialisation expenses are recovered are given below:-

1.6.1. A common situation is where the manufacturer's Government pays in full for the Development and Industrialisation Stages with possibly a margin for profit. On production supplies to the Government a "price" is agreed based on the quantity ordered and their position on the learning curve with allowance for profit. As the Government has paid the Development and Industrialisation expenses in full the production price does not amortise these "costs". On sales other than to the Government the manufacturer is usually expected to allow a royalty in his price which is paid to the Government as a contribution to Development and Industrialisation expenses.

1.6.2. Another example is where the manufacturer's Government pays part of the expenses of the Development and Industrialisation Stages and the manufacturer amortises the balance of these expenses over a particular number of aircraft for inclusion in his delivery "price". On sales other than to their Government the manufacturers may be expected to allow in their "price" for a royalty which will be paid to the Government as a contribution to its share of the Development and Industrialisation expense.

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1.6.3. A further situation is where the manufacturer receives no assistance and amortises the expenses of the Development and Industrialisation Stages over a particular number of aircraft adding this to his average production "costs" before creating his delivery "price".

This situation would apply in the main to civil projects and the objective would be to select the number of aircraft at which a "break-even" financial position would be achieved.

1.7. In those cases where the manufacturer is being paid in full for the Development and Industrialisation expenses provision is made for the "costs" under these Stages to be made up into "Prices" by the addition of appropriate profit margins and other allowances as provided for elsewhere in this paper. These profit margins will differ from country to country and manufacturer to manufacturer and may often be different in application between types of activity.

1.8. The definition of the Delivery "Prices" within the Aircraft Price Section has been limited to two full definitions of Price assuming firstly that no amortisation of the Development and Industrialisation Stage expenses is applied, and secondly, that the expenses for those aspects are amortised. Reference is made to the Government sharing these expenses with the manufacturer in differing proportions but as the sharing method is infinitely variable no precise definition is given.

1.9. In calculating figures for the elements of "cost" within the various stage definitions in this paper the following should be borne in mind:-

(i) In the stage definitions, references to "Costs" are to money "costs" and references to labour "Costs" are to man hours converted into money by the procedures recommended in the Economics Committee's paper on "Pricing Structure". Where appropriate Material "Costs" should include an allowance for Material overheads.

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(ii) Within the definition of Labour "Costs" under each Stage it has not been practical to indicate in detail the differences between the various countries in the allocation of Direct and Indirect types of activity although mention is made of certain differences in the Inspection and Work Preparation areas.

(iii) In many countries it is established that the "remuneration of capital" is an element of "cost" and allowance should be made for this in calculating figures if not already provided for in the rate used to convert man hours to Labour "Costs".

This "remuneration of capital" represents the cost of financing the project and therefore comprises the interest on the capital which the Company carrying out the project has invested in it, either from its own resources or, more likely, by borrowing from Banking Institutions. It is strongly recommended by this Working Group that the procedure whereby "remuneration of capital" is provided for as an element of "cost" should be adopted in all AECMA countries.

(iv) Provision should also be made for appropriate contingencies.

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