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PART 1: SECTION 4

CHAPTER 1

THE SERVICING ORGANIZATION

Introduction

1. The modern military aircraft is a complex and highly-developed machine which demands thorough periodic servicing if it is to be maintained at an acceptable level of operational efficiency. Not only the aircraft itself, but the weapons which constitute its striking power, and the mechanical and electronic devices which guide it to the target, must be checked at regular intervals by specialist tradesmen to ensure continued serviceability. Because of the high initial cost, an aircraft should spend a large proportion of its life in the air to pay for itself. However, every flying hour brings the engine nearer its point of exhaustion, and the various components of the aircraft nearer the limit of their serviceable span. There comes a time, therefore, when flying must cease and the aircraft remain on the ground, while worn-out or unserviceable items are replenished or replaced.

2. For years, study has gone on to evolve a standardized system of servicing that will reduce to a minimum the portion of an aircraft's life during which it is compulsorily grounded, and ensure the highest standards of mechanical reliability and aerodynamic efficiency, together with the best utilization of skilled servicing manpower.

Definition

3. The terms *Aircraft Maintenance* and *Aircraft Servicing* are sometimes confused. They are defined below.

4. **Aircraft Maintenance.** Maintenance in this sense is a broad term which includes the many stages of evolution in the life of an aircraft: design, provision, production, holding, repair and salvage, and distribution. The term is to be used in the comprehensive sense, and *not* to describe technical activities only.

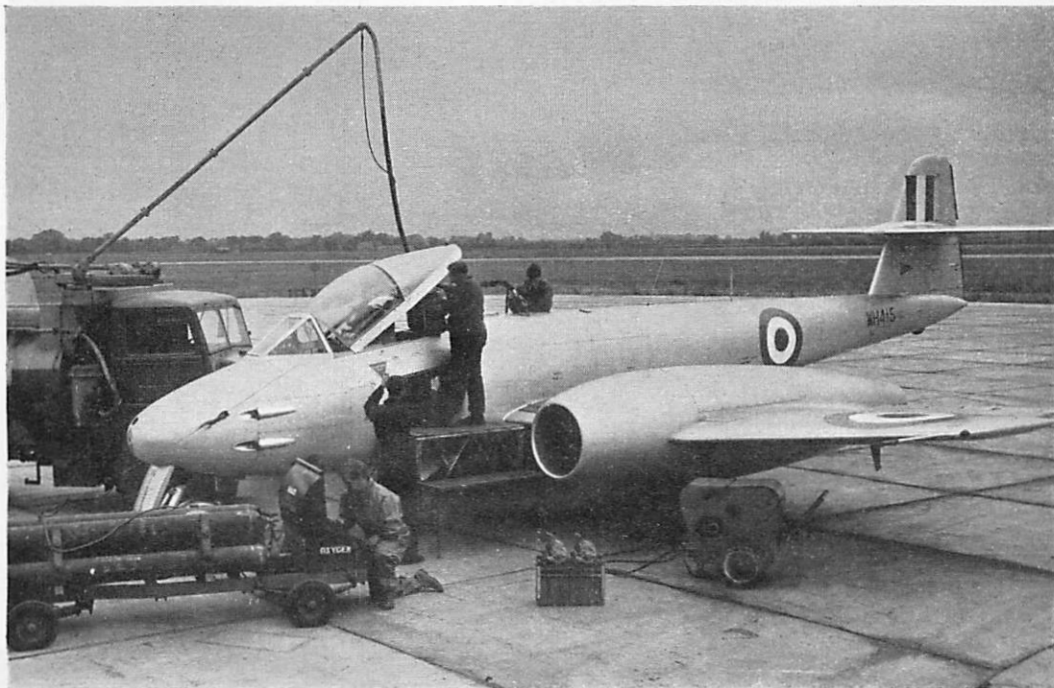


Fig. 1. First-Line Servicing.

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5. Aircraft Servicing. A general term is necessary to describe the technical activities of R.A.F. units, and for this purpose it has been decided to accept and standardize the term *servicing*. This term will thus embrace all such technical activities as inspection, repair, reconditioning, modification, salvage, arming, missile preparation, etc., undertaken by any type of R.A.F. unit.

Stages of Servicing

6. There are clearly many different operations involved in keeping an aircraft airworthy from the time it is received into the Service until it is finally relegated to the scrap-heap. There will be considerable variation in the degree of complexity from one servicing operation to another; some may require the brief attention of one person equipped with a few hand tools; others will involve a host of trained personnel, ponderous ground equipment, and intricate testing apparatus. The evolution of the servicing organization at present divides these operations into four stages:—

(a) First-Line Servicing. First-line servicing (Fig. 1) covers those technical processes which can be undertaken by a squadron with a minimum of personnel and equipment. Refuelling, arming and disarming, as well as pre-flight, between-flight, after-flight, primary, and intermediate servicings, include most of the operations involved in first-line servicing.

(b) Second-Line Servicing. A technical wing is usually formed on an aerodrome from which two or more squadrons may be operating. Its function is to augment the squadrons' servicing operations with certain technical processes of a more involved nature. It sacrifices some of the mobility enjoyed by the squadron in order to accommodate the additional ground equipment and personnel required to carry out the more extensive servicing operations. Minor and major servicings (Fig. 2), replacement of engines, wings, and other fairly major components, are technical processes within the capacity of the technical wing.



Fig. 2. Second-Line Servicing.

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(c) *Third-Line Servicing.* Third-line servicing consists of technical processes which are normally beyond the capacity of either squadrons or their supporting technical wings, but which do not need the facilities of a main base. Typical examples are the salvage of crashed aircraft by special dismantling parties, and the minor rebuilding of partly damaged aircraft where removal to a fourth-line base is not warranted. Third-line servicing thus includes operations of an unscheduled nature, for which special equipment and operators may be required.

(d) *Fourth-Line Servicing.* The remaining technical processes, included under fourth-line servicing, involve practically every operation, including the complete rebuilding of an aircraft and its components. The fourth-line servicing unit is, therefore, a very extensive and static organization. It is equipped with the heavy machinery and special tools and jigs necessary for any operations which may be required to re-create a completely airworthy aircraft (Fig. 3).

Types of Servicing Operations

7. The main periodic servicing operations, in order of frequency, are: daily, daily*, intermediate, minor, and major servicings.

8. Daily and intermediate servicings come into the category of first-line servicing, and are the responsibility of the squadron commander.

(a) *Daily Servicing.* This includes before-flight and after-flight servicings, refuelling, arming, dismantling, etc.

(b) *Daily* Servicing.* This is done at intervals not exceeding two weeks. It includes daily servicing, plus certain items which need not be done daily, but which must be done at intervals between minor servicings (e.g. topping up hydraulic tanks).

(c) *Intermediate Servicing.* This servicing is done at intervals specified by commands according to the utilization of the aircraft and the conditions under which they are operated in the unit concerned. It largely consists of anti-deterioration servicing.

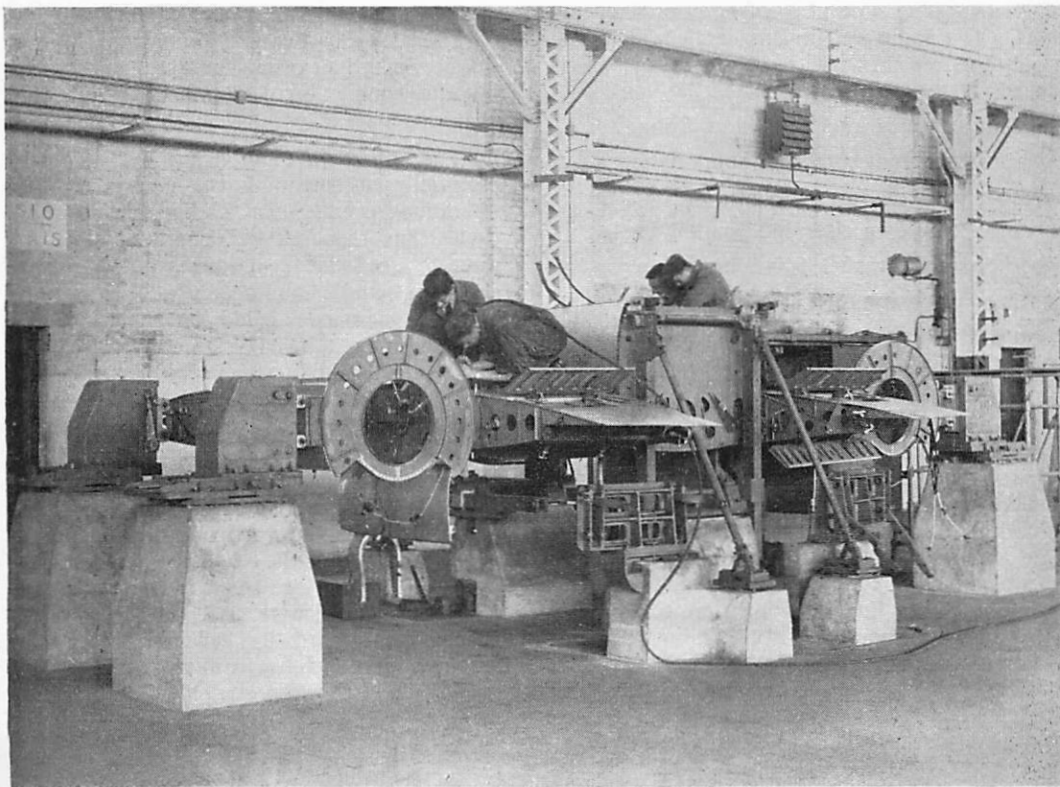


Fig. 3. Fourth-Line Servicing.

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9. Minor and major servicings are in the second-line category. They are done by the technical wing supporting the squadron at intervals based on flying hours or time periods decided by commands.

(a) *Minor Servicing.* This is done at intervals of 100 flying hours.

(b) *Major Servicing.* This is done at flying-hour intervals specified by commands.

10. As its name implies, the minor is very much less extensive than the major servicing. The scope of successive minor servicings is varied by "starring" certain operations in the servicing schedule to ensure that none of the components or assemblies involved is serviced either too much or too little. The servicing cycle is drawn up to include a number of minor servicings (where unstarred operations only are carried out), alternating with a number of minor* servicings (where unstarred and starred operations are carried out). The major servicing completes the servicing cycle, and includes all the operations covered by the preceding series of minors, plus a number of additional operations. The complete servicing cycle will follow a pattern similar to the one given below, which is a 100,800 servicing cycle :—

Minor servicing after 100 hours flying.

Minor* servicing after 200 hours flying.

Minor servicing after 300 hours flying.

Minor* servicing after 400 hours flying.

Minor servicing after 500 hours flying.

Minor* servicing after 600 hours flying.

Minor servicing after 700 hours flying.

Major servicing after 800 hours flying.

11. Every aircraft must eventually reach a state when a major servicing will not suffice to render it completely airworthy. At this point the aircraft may be scrapped (if others of the same type are plentiful, or if it has been superseded by a new aircraft type); or it may be taken to a third- or fourth-line servicing unit to undergo a complete overhaul or reconditioning. Thereafter the aircraft virtually starts a new life (although all old records are retained), and the servicing cycles begin anew.

12. Transport Aircraft.

(a) For transport aircraft, a system of progressive servicing has replaced the minor/major cycle to fit the specialized role of their trunk route operations. This system provides for *route servicing* (a first-line servicing) at each stopping place on trunk routes, a *terminal servicing* at the terminal staging post, and *base servicing* in place of minor servicings. The term major servicing disappears, the work which is normally associated with this servicing being spread evenly over a number of base servicings which form the progressive cycle. Certain base servicings are annotated with one, two, or three stars to denote their position in the servicing cycle. A new cycle is started after completion of each base three-starred servicing. The terminal is a servicing interposed between base servicings to provide the absolute minimum servicing operations at terminal points on trunk routes.

(b) The period between base servicings is normally 100 hours, this time being capable of variation within wide limits to suit the flying time for particular scheduled services. A complete progressive cycle comprises eight base servicings. Reconditioning at a fourth-line servicing unit or civil contractor is carried out after completion of a number of progressive cycles.

(c) The progressive servicing system aims essentially at spreading the major servicing operations evenly over a complete servicing cycle, thus reducing the length of time the aircraft need be grounded for each base servicing, and simultaneously limiting the servicing demands made on staging posts abroad. The minor/major system, on the other hand, is well suited to the needs of operational and training units, the relatively short period of grounding necessary for each minor servicing, and the longer one after every 400, 600, or 800 hours for major servicing, being easily fitted into their flying programmes. One factor, which has an important bearing on the development of the progressive servicing system, is that the trunk route squadron, because of the length and frequency of its sorties, will normally achieve under this system a very much higher intensity than would be possible with the minor/major servicing system.

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