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W. A. Hamilton

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SAFETY IN AIRLINE MAINTENANCE*

W. A. HAMILTON‡

In order that you might have a better understanding of the safety measures involved in this great industry, I am going to take a few minutes to explain some things about our maintenance system and our safety program.

Few people realize the magnitude of the operations, the research engineering work, and close inspection involved in maintaining constant schedules with a fleet of giant air liners.

The T & W, A. maintenance system has set up five terminal stations and fifteen intermediate stations to service and maintain our fleet of luxury sky liners.

Efficient maintenance and service crews are set up at every T & W A station. The five terminal stations are under the direct supervision of the system maintenance superintendent. Each of these terminal stations uses a definite uniform system for servicing and maintaining the T & W A fleet of sky liners in perfect condition.

When an airplane arrives at one of the terminal stations it is checked in by a highly trained and well qualified inspector. The pilots' reports are analyzed and listed. The plane is then docked at a large maintenance stand and the entire plane, all its equipment and accessories, carefully inspected. All items, regardless of how minor they may be, if in need of adjustment, replacement, or servicing, are corrected and brought up to the standard of new equipment.

In order to assure that all items will be in perfect condition, all items requiring attention are written up on the inspection sheets by the inspector and signed for by the mechanic completing the correction or servicing of the item. Not a single item is overlooked.

We have set up a series of maintenance operations covered definitely by written instructions, which are performed whenever specified flying hours have been attained.

These operations will be explained more fully by one of our

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‡ System Maintenance Superintendent, Transcontinental & Western Air Lines, Inc., Kansas City, Mo.

engineers on your visit to our Kansas City maintenance base this afternoon or tomorrow morning. The operations in brief are:

Operation No. 1—Major 100-hour inspection and service.

Operation No. 2—Daily Inspection.

Operation No. 3—Major 50-hour inspection and service.

Operatoon No. 9—Engine change.

Operation No. 10—Structural check.

and miscellaneous periodic operations governing all equipment.

In order to maintain efficient operations throughout the T & W A system, in addition to engineering and organization, the following definite factors are considered by T & W A. They are, in the order of their importance: Safety, Personnel, Environment, Training, Equipment, Research.

Safety: Every one of our terminal and intermediate stations are first considered from a definite safety standpoint and are incorporated as one in a constant safety drive engineered from our Kansas City base.

Our personnel are drilled on safety measures. Every effort is made to maintain shops as safely as possible through the proper protection of hazards and the proper set up and enforcement of safety rules. Special bulletins are issued on safety precautions; all new employees are thoroughly instructed and examined on the standard rules, as set up by our safety engineering.

Personnel: Our Personnel are of the highest type that can be selected, well trained, efficient, co-operative. They can adapt themselves quickly to problems and follow each problem through to an efficient completion. The majority are well educated, of excellent general ability and qualified specialists in one or more of the subdivisions of mechanics, engineering, etc., coming under Air Line Maintenance.

Environment: Every effort is made to make our shops desirable to work in. Each department is well lighted and ventilated. The Foreman, Crew Chiefs are of the leader type, well liked by the men serving under them. The personnel use their own incentive in working up entertainment programs. Various types of sports are engaged in by groups of our personnel; competitive games being played with other sporting associations. I believe that environment is one of the outstanding contributions towards safety. It makes keen witted, alert employees. The type that must be had in every phase of air line maintenance and operations.

Training: Eleven divisions of schools are maintained by T & W A for the advancement of individual knowledge of every employee. Special classes are given, covering airplane and engine mechanics; special training courses are set up to train personnel on new equipment when equipment changes are made. This enables us to keep our personnel trained up to the standards necessary to keep up with the advancements of modern air transportation.

Equipment: T & W A shop equipment is of the very latest type. One of the finest maintenance departments in the aeronautical world is maintained here at Kansas City. One of the most important links to safe operation is proper shop equipment to produce master craftsmanship for the precision units as used on air transport planes.

Records: The strict enforcement of the maintenance routine, as engineered for the T & W A maintenance system, has resulted in a high standard of safe operations of T & W A sky liners with an exceedingly small amount of station delays due to mechanical difficulties. A record of 37,000 miles of continuous schedule flying per minor mechanical delay over our transcontinental system has been made by T & W A. This record was arrived at by averaging the number of delays from mechanical difficulties of our fleet requiring correction on arrival of planes at T & W A stations for a period of one million miles of operation.

An easy way to arrive at the significance of this record would be to consider a fleet of twenty-seven cars driving a million miles, taking all mechanical difficulties and averaging them up for the period. I am sure the comparative results would be interesting, and would reflect the superior mechanical perfection now prevailing in air transportation.

Research: It would be impossible to expect advancement without an efficient research department. We have established a department to develop new ideas and to thoroughly check new equipment units.

New units developed through research and engineering are first checked for accuracy and safety by our research staff, then installed in our flying laboratory (a special plane used by T & W A as a proving ground by trained research pilots). The unit is then given a very thorough endurance check. The unit being tested must measure up to the most exacting standards during flight test and must prove a high factor of safety, reliability and accuracy. After satisfactorily passing this flight test the unit is then removed

from the plane and re-routed through our research department where it will be disassembled and an inspection made to determine the condition of the part.

Special maintenance instructions are then set up by our maintenance engineers.

It is this system of research that enables aviation to make the rapid and very accurate advances which are being made continuously by the air transport companies of today.

In closing, I wish to emphasize that safety is the paramount consideration of air line maintenance and it has been achieved to a remarkable degree.