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DEPARTMENT OF THE AIR FORCE
NATIONAL AIR & SPACE INTELLIGENCE CENTER
WRIGHT-PATTERSON AFB OHIO

23 September 2020

Colonel Paul K. Harmer
Vice Commander
4180 Watson Way
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Sincerely,

PAUL K. HARMER, Colonel, USAF
Vice Commander

Attachments:
Releasable Documents

TECHNICAL REPORT

NUMBER 34

AN INTERPRETATION OF MARKINGS

ON

FOREIGN AIRFRAMES, ENGINES, AND COMPONENTS

APRIL 21, 1952

AIR TECHNICAL INTELLIGENCE CENTER
WRIGHT PATTERSON AIR FORCE BASE
DAYTON, OHIO

[redacted]

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Wright-Patterson Air Force Base
Dayton, Ohio

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Air Force-WPAFB-O-5 NOV 51 10M

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TECHNICAL REPORT NO. 34

AN INTERPRETATION OF MARKINGS

ON

SOVIET AIRFRAMES, ENGINES, AND COMPONENTS

April 21, 1952

PREPARED BY

BATTELLE MEMORIAL INSTITUTE
COLUMBUS, OHIO

COORDINATED BY
AIR TECHNICAL INTELLIGENCE CENTER

519-108019

[redacted] SECURITY INFORMATION

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SECURITY INFORMATION

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TECHNICAL REPORT NO. 34

AN INITIAL INTERPRETATION OF MARKINGS ON SOVIET AIRFRAMES, ENGINES, AND COMPONENTS

April 21, 1952

From: Battelle Memorial Institute

Report Prepared By: [redacted]

I. SUMMARY

A. Problem

The objective of the work reported here was to attempt to interpret and systematize the markings found on Soviet airframes, engines, and components.

B. Facts Bearing on the Problem

Soviet aircraft parts are being analyzed and evaluated to determine the types and properties of the materials used, the methods and quality of fabrication, and the design and operational characteristics. These parts are received from foreign sources on an occasional basis. In most cases, only one or two items of the same type are available for examination. Exceptions to this general case were exhaust valves for the

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ASh-62 engine, and pistons and piston rings for the ASh-62 and M-11 engines.

Most of the Soviet aircraft parts examined were representative of reciprocating-engine-propelled aircraft, such as the IL-10 and LI-2. These parts included carburetors, oil pumps, piston assemblies, landing-gear components, airframe pieces, hoses, gaskets, tires, and bearings.

One group of parts examined was representative of reaction-engine-propelled aircraft. These parts were from a MIG-15 type of aircraft and included a turbine blade, a tail pipe, and a horizontal stabilizer.

Of the Soviet reciprocating-engine parts available, some were new and others were used; many of the used parts were damaged. All of the parts in the reaction-engine group were used and damaged.

Approximately 200 different parts have been examined for markings.

C. Brief

This report presents an initial attempt to interpret correctly the markings found on Soviet aircraft parts. It is submitted with the full realization that most, if not all, of the conclusions represent essentially opinions. The team working on this effort disagreed on the possible meanings of some of the markings. Where such a condition arose, and could not be resolved, all of the interpretations are presented.

Those involved in markings analysis have found it a most intriguing problem, since the correct answers are so obscure. In attempting to

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find solutions to the meanings of some of the markings, the team made use of chemical, metallurgical, and production-engineering analyses, as well as Soviet published literature. The team also employed Soviet political and economic information integrated with technical information from Soviet handbooks on aircraft and construction materials.

The almost complete lack of information pertaining to the meaning of the markings on Soviet aircraft parts has made this attempt at interpretation difficult. However, the effort is continuing with the feeling that, in time, the opinions tentatively proposed here will be confirmed or changed. This will occur most rapidly if all captured Soviet aircraft parts are searched for markings, and then the markings systematically recorded, collated, and interpreted.

The team working on markings analysis feels that important qualitative information on Soviet technology will eventually be forthcoming from such an effort. Valuable Soviet economic and production data are being obtained currently from this study.

This effort to analyze Soviet aircraft markings includes an attempt to systematize the varied types of markings. This is believed to be the first logical step toward the eventual correct interpretation of the markings. It is intended to reveal the possible meanings of Soviet markings and to permit the integration of these markings with markings analyses accomplished elsewhere.

The general procedure followed in accomplishing markings analyses will be described. The supporting chemical, metallurgical, and

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production-engineering analyses are contained in many technical reports already published or to be published; the technical data will not be presented in this report.

As each Soviet aircraft part was received, it was identified with an internal control number. The piece was then examined for Soviet packing or shipping tags, or other descriptive Soviet literature. If the piece was received in a container or wrapped, the container and the wrappings were also closely examined for markings.

Free-hand sketches and photographs were then prepared for each piece. All external markings were recorded on the free-hand sketches according to location, and any colors or unusual identifying marks were noted.

Since many of the pieces examined were made up of more than one part, and were to be performance tested prior to disassembly, internal markings were not recorded for such parts until after performance testing. Following the recording of internal markings, the parts were tested destructively for composition and physical and mechanical properties of the materials. These data, as well as those on performance and design, were integrated with the markings data, and an analysis of the markings accomplished. Data on the technical aspects of each of the pieces and the markings interpretations pertinent to each piece were recorded and subsequently published, or are being published.

This report presents the markings interpretations as of August 31, 1951.

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D. Conclusions

1. The numbers of Soviet airframe, engine, and component parts examined thus far have not been sufficient to permit the development of a sound classification system for markings.

2. The markings information thus far developed, although primarily conjectural, shows sufficient promise to make continuation and expansion of the effort on markings analysis worth while.

3. Several types of Intelligence data may result from the analysis of Soviet markings. These data will assist in the evaluation of Soviet production, qualitatively and quantitatively, as well as provide the Intelligence analysts with an insight into political and economic features of the U.S.S.R.

4. There should be a planned effort within U. S. Intelligence channels to insure that all markings information is disseminated from one markings-analysis group to others, and that all Soviet materiel examined anywhere for any Intelligence purpose is scrutinized for markings.

E. Future Action

It is recommended that the effort to interpret marks on Soviet materiel be continued. This effort should be carried out in a systematic manner and directed toward the collection and integration of markings data on any Soviet-produced item. It is recommended that the proper

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Intelligence agency form a committee, composed of Intelligence personnel from all of the Services, which will be responsible for the proper exploitation of Soviet markings as a source of Intelligence information. It is envisioned that this committee would be responsible for (1) alerting collection facilities, (2) delegating responsibilities to the Services, (3) disseminating unevaluated or evaluated markings data by an appropriate agency, and (4) integrating markings interpretations.

II. MARKINGS INTERPRETATION

A. Qualification of Interpretations

The reliability of the markings interpretation presented in this report varies from probably true to purely conjectural. In all cases where a particular type of marking was noted, and the interpretation could not be confirmed by other data, the analysis indicated is conjectural. Where one or more parts were examined and substantiating evidence from other sources was available, the interpretation is probably correct. In cases where even an opinion is hazardous, the opinion is submitted on the premise that other markings analysts may be able to examine the thinking that resulted in the opinion and further develop it. Further, hazardous opinions, though unconfirmed by any other source of data, were specifically requested by other markings analysts. They consider such opinions to be representative of original thinking, and since there are so few reliable data on the meaning of Soviet aircraft

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markings, there is ample room for original thinking. Those opinions which are difficult to substantiate represent a thoughtful effort toward an initial interpretation of Soviet aircraft markings, the meanings of which are most obscure.

B. Basic Assumptions

Several assumptions have been made in order to establish plausible limits for interpreting Soviet aircraft markings. These assumptions are:

(1) The U.S.S.R. maintains rigid quantitative and qualitative control in the production of aircraft and component parts.

(2) The U.S.S.R. will not necessarily mark aircraft and component parts using systems which are standard in the United States, the United Kingdom, or Germany. The Soviet system may be in part similar to United States, United Kingdom, or German practice, or it may be entirely different.

(3) The U.S.S.R. is conscious of security, both from the internal and external aspects. They are suspicious of their own workers and feel that foreign powers might be able to develop accurate estimates of the Soviet scheme of production by markings analysis.

(4) In order to control its workers, the U.S.S.R. may develop marking systems which, being known to the worker, theoretically will make him more careful.

[redacted]

An apparent confirmation of some of these assumptions is indicated by the interpretation of Soviet-factory routing sheets. Some of these sheets were found in packages of replacement parts for Soviet aircraft engines. On such routing sheets appeared the name of the factory, the name of the section of the factory, the signature of the factory chief inspector, the signature and symbol of the chief OTK* inspector, and the signature and/or symbol of the resident military representative ВП (Военный Представитель). In some cases, the signature of either a shift boss or an individual machine operator was evident. The dates of production and of part inspection were noted on all routing sheets.

Logically, it would be expected that the finished part and its most important components would be marked by similar inspecting agencies. These would be the factory inspector, the OTK inspector, and ВП (military) inspector. Those aircraft parts which had been manufactured prior to 1950 carried all three inspection markings on each assembly, subassembly, or component part. The factory inspection mark appeared in the form of a circle or a square with a number inside. The number is probably the identification mark of a particular inspector. The OTK markings generally consisted of a diamond, a square, or some other closed form containing the symbol OTK and a number, believed to be the identification mark of a particular OTK inspector. The military representative markings (ВП) appeared on name plates, finished assemblies, and subassemblies. This

* OTK, Section of Technical Control, Отдел Технического Контроля.

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mark, with and without an inspector's number, was usually found enclosed in a plain five-pointed star.

C. Markings Classification

In order to systematize the markings data gathered from the numerous aircraft parts thus far observed, a tentative classification system was developed. It is hoped that classifying the various markings data into appropriate categories will assist those attempting to interpret the markings elsewhere, and that a classification system might aid in indicating certain meanings which otherwise would be missed.

The initial classification of marks on Soviet aircraft parts is as follows:

(1) Name plates

(2) Inspection markings

(a) Factory inspection

(b) OTK inspection

(c) ВП inspection

(d) Enclosing shapes

(3) Factory identification

(4) Dates

(5) Materials

(6) Quality

(7) Assembling directions

(8) Special marks

[redacted]

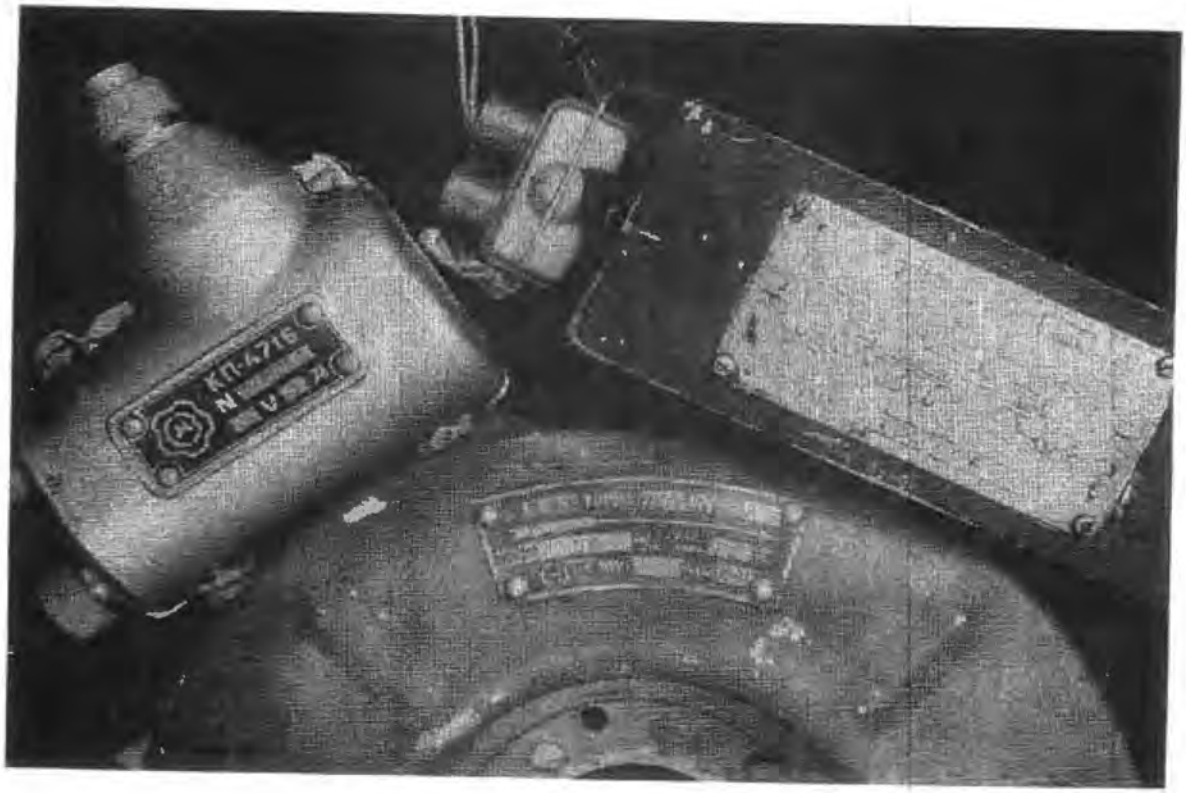
Examples of specific markings observed thus far on Soviet aircraft parts will be presented. All of these markings are placed in one or more of the above categories. The more important ones will be discussed and interpreted with respect to the category in which they have been tentatively placed.

1. Name Plates

Name plates were noted on nearly every complete assembly, major subassembly, or accessory, such as the horizontal stabilizer, carburetors, oil pumps, and fuel pumps. Some of the pieces had no name plates, but showed definite signs of having at some time carried name plates which had been removed accidentally or intentionally (see Figures 1 and 2).

The majority of the name plates observed were made of painted aluminum-alloy sheet showing identifying trademarks (Figures 1 and 2). Others were embossed in the material of construction. Examples of typical trade marks are:

The name plates also carried the identification letters and numbers of the assembly or subassembly. Examples noted on carburetors are: К-42БПД, К-11ВФ, and К-11ВФИ. The letter К indicates the carburetor series, while the numbers and other letters indicate the model and/or type of carburetor. It is felt that the type of engine to



79846

Figure 1. Typical Name Plates on Soviet Aircraft Components.

Electric Motor for Tachometer Electric-Circuit Filter

Brake Drum

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Exp (b)(3) 10 USC 130B,
Exp (b)(6)

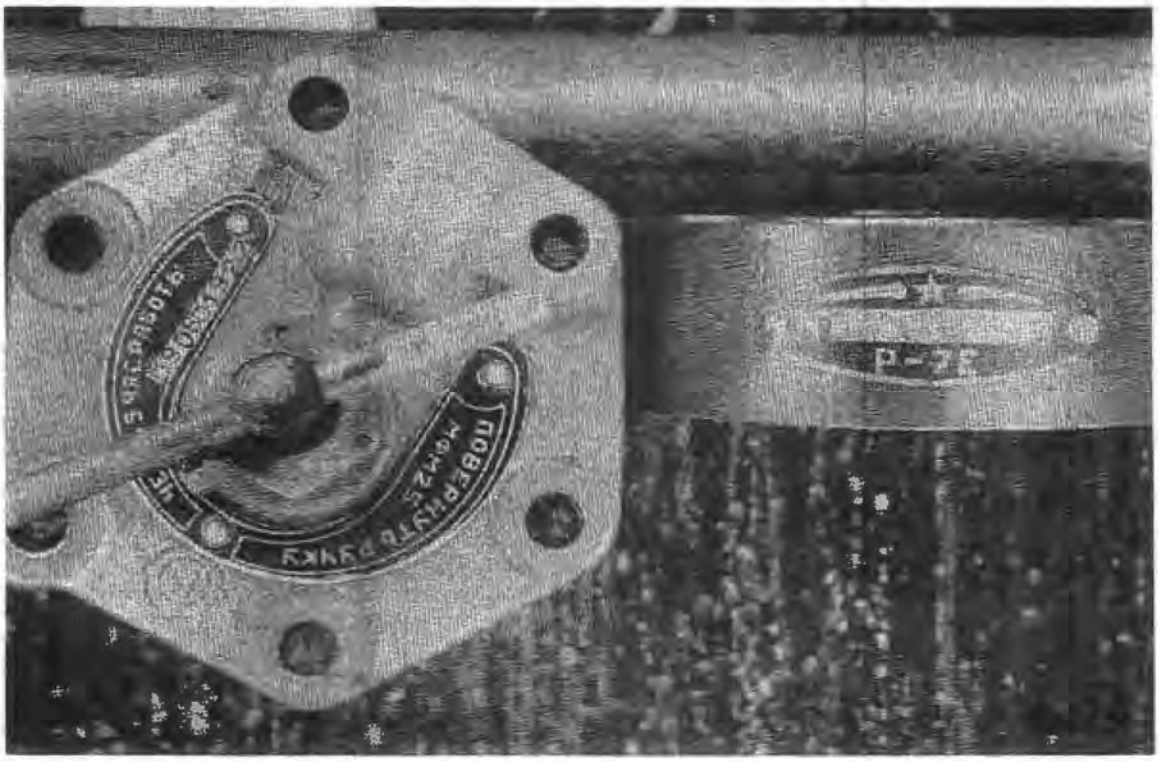

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Figure 2. Typical Name Plates on Soviet Aircraft Components.

Oil Filter Propeller Governor

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which the carburetor is attached is also indicated. For example, AK-42 is an oil-pump identifying number, while БНК designates a gasoline pump, СФ an electric-circuit filter (see Figure 1, upper right), Р a propeller governor, (see Figure 2, right), БСМ a magneto, etc.

Some name plates showed the markings of the ОТК, generally embossed on the plate with the inspector's number stamped in the plate. The mark ВП with its corresponding number was also observed on name plates (see Figure 3).

The date of production generally appeared on the name plate (see Figure 3) as a series of numbers. The first number indicated the day; the second, the month; and the last two, the year. In the case of rubber goods, such as tires, tubes, packing rings, etc., which do not carry metal name plates, the above information was embossed on each item. It appears that the markings were molded in during fabrication. For example, on rubber tires, it was determined that the raised Cyrillic letter " Я " represents the trademark for the Yaroslav Rubber Factory (Figure 4). A serial number was noted but could not be interpreted.

2. Inspection Markings

Each Soviet aircraft and engine component, whether a major assembly or a nut or bolt, carried one or more inspection marks. An exact interpretation of such markings is difficult. However, it appears that there are two general classes of inspection marks. One class includes those marks placed on a part by the factory inspector. The

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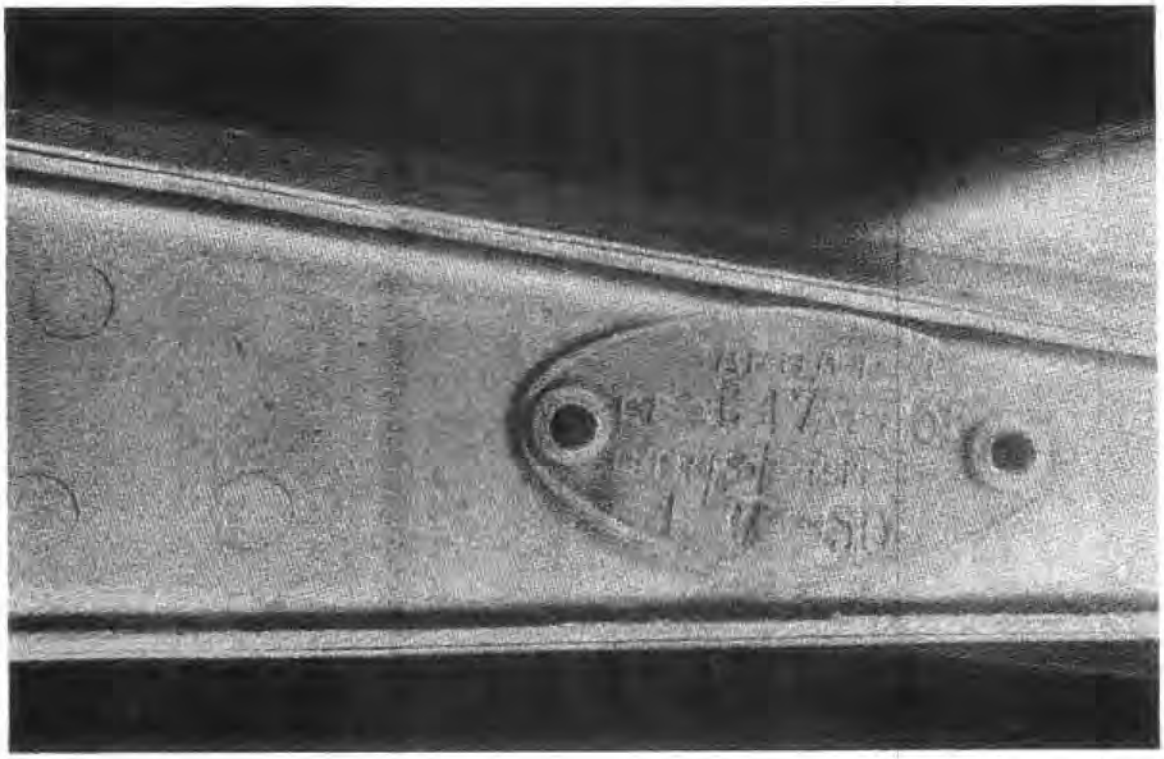

79845

Figure 3. Name Plate on Horizontal Stabilizer of MIG-15 Aircraft.

3ABOA (Factory) 153

CEP (Serial) CA7 A Г P (Group) 55

OTK 80/5 B П

1 Day 7 Month 1950 Year Г (year)

1 July 1950

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Exp (b)(6)

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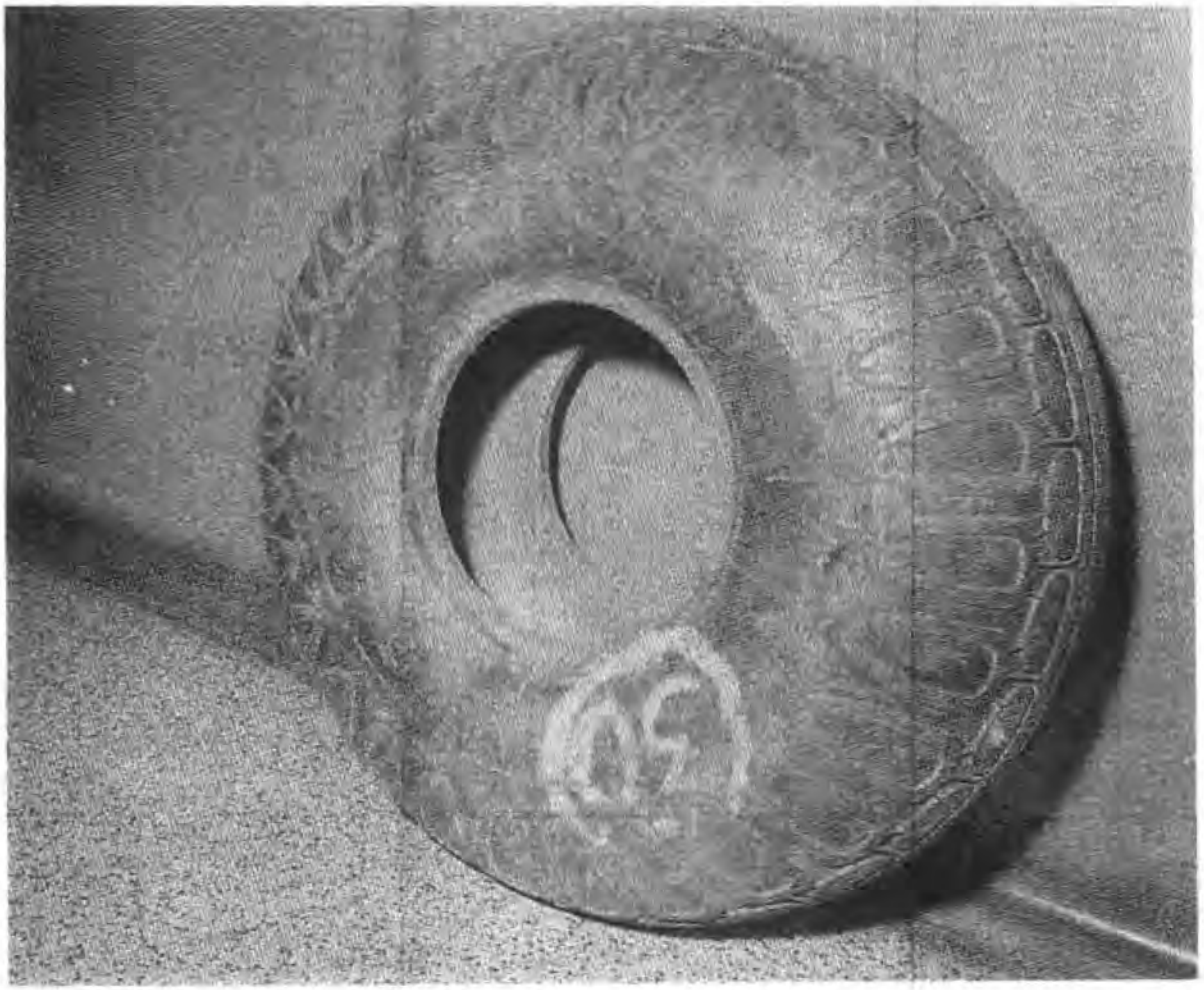

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Figure 4. Soviet Aircraft Tire From Yaroslav Rubber Factory. Note the " Я " in the circle in the upper right quadrant.

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other class includes the marks placed on a part, subassembly, or assembly by Soviet inspectors who represent agencies outside the factory; such markings appeared on many different assemblies which had been manufactured in different plants. Each of these classes is discussed in detail below.

Inspection marks are defined for markings interpretation as those letters or numbers stamped, stenciled, etched, or punched into the pieces. Cast, embossed, or molded letters and numbers are not necessarily classified as inspection marks. This should be remembered when attempts are made to clarify a specific marking.

In interpreting inspection marks, information gained from a study of Soviet log books and routing sheets, and their associated parts, was employed in the interpretation of inspection marks. When the data in the log book and/or routing sheet are combined with the inspection marks on the appropriate part, it is suggested that the following type of action has occurred:

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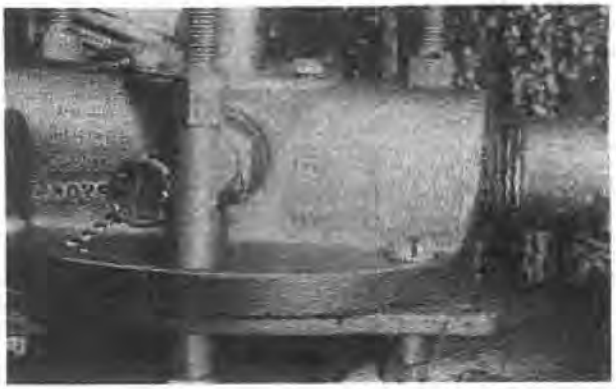

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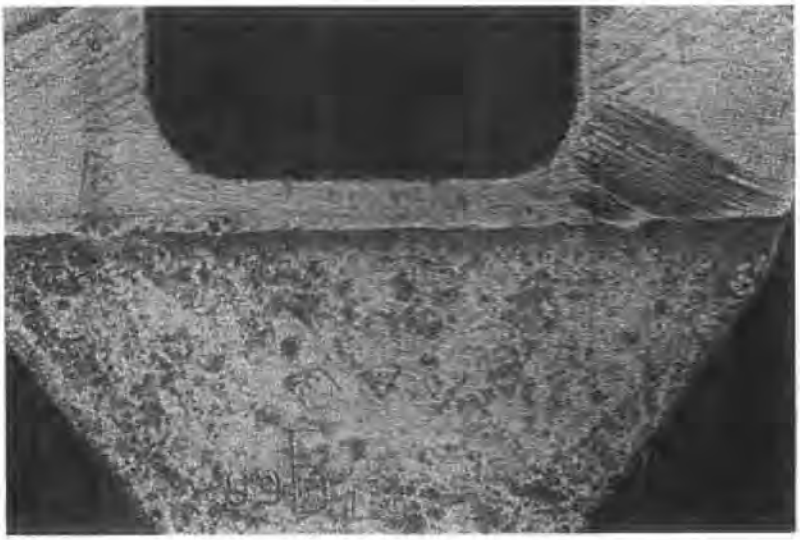
Three-Port Valve Selector



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Center Balance Weight, Horizontal Stabilizer, MIG-15 Aircraft

Figure 5. Typical Soviet Factory Inspection Marks Observed on Soviet Aircraft Parts.

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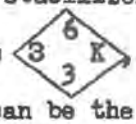
On the newest aircraft parts examined, such as the MIG-15 horizontal stabilizer, a different type of mark was observed. This appeared as 

and is thought to be a factory inspection mark, since 3 K can be the initials of ZAVOD (factory) KONTROLb (Control). (See Figures 6 and 11, top.)

When two numbers were noted, it is believed that one is the inspector's number and the other represents the section of the factory carrying out the inspection. No other explanation is apparent as yet.

There appears to be nothing unusual or particularly significant in the factory inspection marks observed thus far. They do not seem to change from year to year, with the exception of the addition of the initials ZK (Factory Control) on parts made in 1950. It seems apparent that factory inspection is carried out on a 100 per cent basis and that every item is inspected at least once. The specific characteristics or qualities being checked by the inspectors are not known. However, it appears that primarily they check dimensions.

b. <u>OTK Inspection Marks</u>. OTK inspection marks usually appeared as OTK inserted in a closed form such as an ellipse, rectangle, circle, or trapezoid. In the same enclosing form was a number which is believed to be the individual OTK inspector's identification. In some cases the OTK appears as  (Figure 7); it was also observed embossed on name plates as OTK with space provided for a stamped number. (See Figure 7.)

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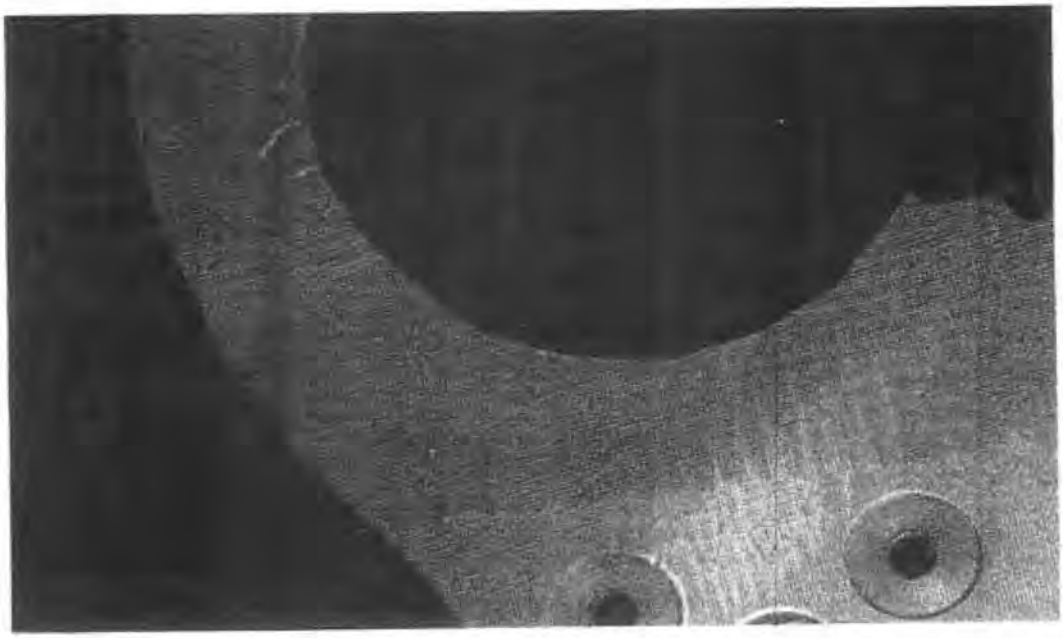

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Figure 6. Factory Control Mark Observed on MIG-15 Aircraft Horizontal Stabilizer.

(ЗК = ЗАВОДСКИЙ КОНТРОЛЬ

Translated as "Factory Control".)

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79862

ASH-62 Piston, Inside Bottom

79854

Fuel Filter

79861

M-11 Piston - Inside

Figure 7. Typical OTK Marks Observed on Soviet Aircraft Parts

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The exact status of the OTK inspector is not known. From the manner in which the symbol was used, as well as from the study of log books and routing sheets described previously, it appears that the OTK inspector is a civilian-agency representative whose mission is to check the factory inspectors. Since the OTK symbol and the inspector's number appeared on many different components manufactured in different plants, it is reasonable to assume that the OTK is an interfactory agency. Also, since the symbol was observed on aircraft components made from metals or rubber, the OTK may be an agency that is concerned only with aircraft parts. However, the OTK is more likely an agency responsible for the technical control on all materiel, aircraft or other, since the symbol OTK has appeared in overt, unclassified, Soviet publications.

The OTK symbol appeared less frequently on parts made in 1950 than on those made previously. This mark appeared on assemblies or subassemblies produced in 1950, but not on the separate pieces of each assembly. The reason for this change in procedure is unknown. Two possible explanations are: (1) the OTK may have decided to inspect only assemblies and subassemblies, rather than component parts and (2) the U.S.S.R. may not have inspected those parts produced for export as closely as they inspected parts to be used by Soviet military organizations.

c. <u>ВП Inspection Marks</u>. ВП (Военный Представитель), the initials of the agency which inspects and accepts parts for the Soviet Army, usually appeared inscribed in five-pointed stars. Within the same stars were noted numbers, probably the identification of particular ВП

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representatives. ВП marks also were embossed on name plates; official acceptance was probably indicated where a mark was stamped in the name plate to the right of the embossed ВП . In some cases, a five-pointed star with a number stamped in it was observed. This is considered to be a ВП symbol also. It is to be noted that a five-pointed star is the symbol commonly employed by the Soviet Army. (See Figure 8.)

The appearance of a ВП mark within a star or the appearance of a star is interpreted to mean that the component or assembly had been inspected and accepted for use by the Soviet Armed Forces. ВП marks appeared more frequently on Soviet aircraft parts which had been manufactured prior to 1950, although the ВП mark appeared on the name plates of parts made after 1950 (see Figure 3). This is interpreted to mean that parts, subassemblies, or assemblies made for use as spare or replacement parts, or parts which had been reprocessed, are inspected by both the ОТК and ВП individually. It should be recalled that most of the parts examined for markings had been stocked in a warehouse at Kimpo. These parts probably were produced as spares and therefore were inspected and accepted individually.

d. Enclosing Shapes. There is a feeling that the shape of the form surrounding the ОТК, ВП , or the factory inspector's symbol and number indicates the section of factory which carried out the factory inspection, the district of the ОТК inspection, and the district of the ВП inspection. Although efforts have been made to clarify this feeling, the meaning of the shape of the enclosing form is not known. (See Figures 3, 5, 6, or 8.)

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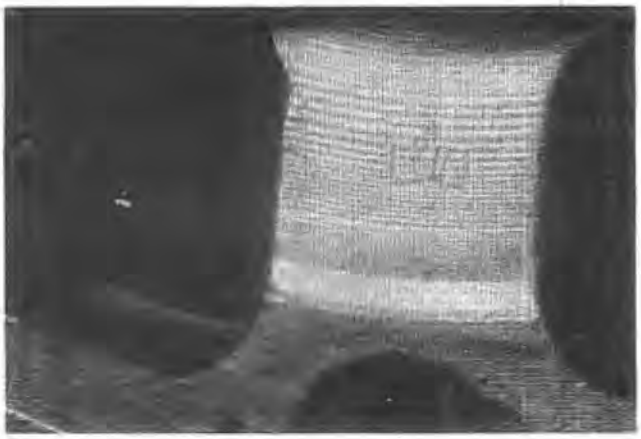
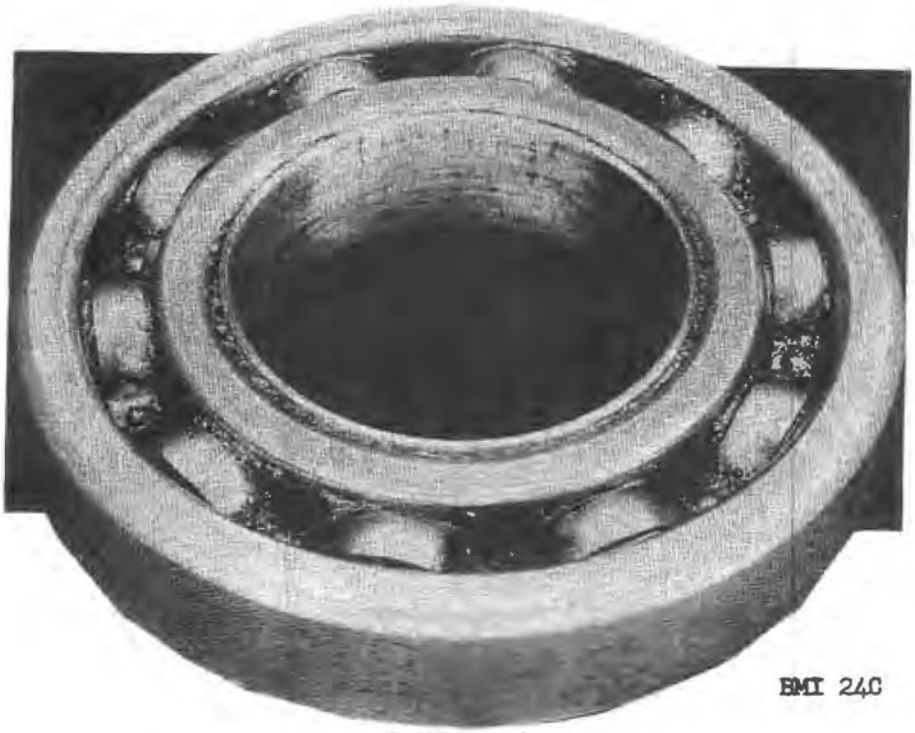


79858

Brake Drum of Main Landing-Gear Wheel Assembly for IL-2 Aircraft.



BMI 240

Ball Bearing

Figure 8. Typical B П Marks. Notice the B П enclosed in the Red Army star. In Figure 3, the B П is not enclosed.

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In some cases, perhaps the OTK or ВП , though not marked as such, may be indicated by the shape of the enclosing form. An ⬠ or ⬡ may indicate the OTK. It appears that the five-pointed star always represents the ВП . Perhaps the meanings of the various shapes will become clear as more data are collected.

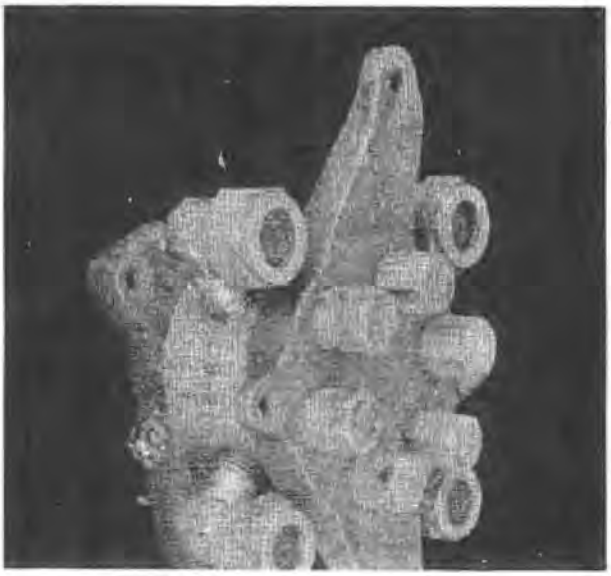
3. Factory Identification Mark

The factory which manufactured a particular item was identified on nearly every part, subassembly, or assembly. Sometimes the factory identification was obvious, as indicated by a trade mark (see Figure 1). In some cases the factory was designated by the word ZAVOD (meaning factory) followed by its number, or by the initial З-Д followed by the number (Figure 9). In repeated instances, the series of numbers representing the serial number of a particular part included the factory number. This has been established by a positive identification of the factory. For example, as indicated in Figure 10, the name plate on the MIG-15 horizontal stabilizer carried ZAVOD 153, and the 153 was also part of the serial number 06153 99.

4. Date of Production Identification

Many airframe, engine, and component parts had marks which indicated the date of production. From the interpretation of all the dates observed, it appears that the date of production is the date that the airframe, engine, or component part was completed, inspected, and accepted.

[redacted]



Factory 305

80343

Valve-Assembly Selector. Four Parts With Handle.

Factory 36

79856

Tapered Chromium-Coated Piston Ring (Compression) of ASH-62 Engine.

Figure 9. Factory Identification Marks

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[redacted]

79843

Name Plate

79850

External Skin

Figure 10. Factory 153 Identification on MIG-15 Horizontal Stabilizer.
Note ZAVOD (Factory) 153 in the top photograph, and the number 153 within the serial number of the entire horizontal stabilizer (and perhaps the aireraft?) in the bottom photograph. OTK and B П marks are also evident in the top photograph.

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[redacted]

The date of production appeared as either part of a serial number; stenciled, stamped, or etched in a piece of material; or stamped on a name plate. The date of production may appear as 4-7-50 (Figure 10, top), representing July 4, 1950, or as 99 (Figure 10, bottom) representing September, 1949 (ninth month of the 49th year). Also noted was ДАТА X-48 (Figure 1, bottom) representing October, 1948, and $\frac{II}{49}$ representing February, 1949.

The Soviets write their complete dates as follows: day - month - year (see Figure 3); in dating the components, the day is sometimes omitted. Either Arabic or Roman numerals may be used to indicate the month, while the year may appear either as one or two Arabic numbers, for example, 9 or 49, each representing 1949. On the components examined thus far, the year has not been written in Roman numerals.

5. Material Identification

In several instances, the markings observed on a part indicated the type of material used. There were other markings which seemed to indicate the material used, but actually did not. The markings analyst is cautioned against concluding that an unusual mark describes the material. The best procedure is to confirm or reject the indication on the basis of materials analysis, at least until a definite pattern of interpretation is established.

Aluminum-alloy sheet stock observed in the horizontal-stabilizer assembly of a MIG-15 aircraft carried the marking $\boxed{\text{D } 16\,\frac{2}{1}\,\text{M}}$ (see Figure 11).

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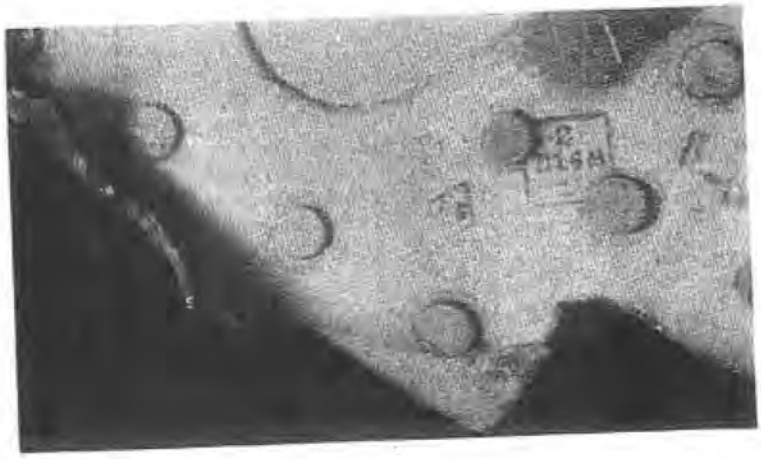

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78668

Figure 11. Materials Marks Observed on Horizontal Stabilizer of a MIG-15 Aircraft.

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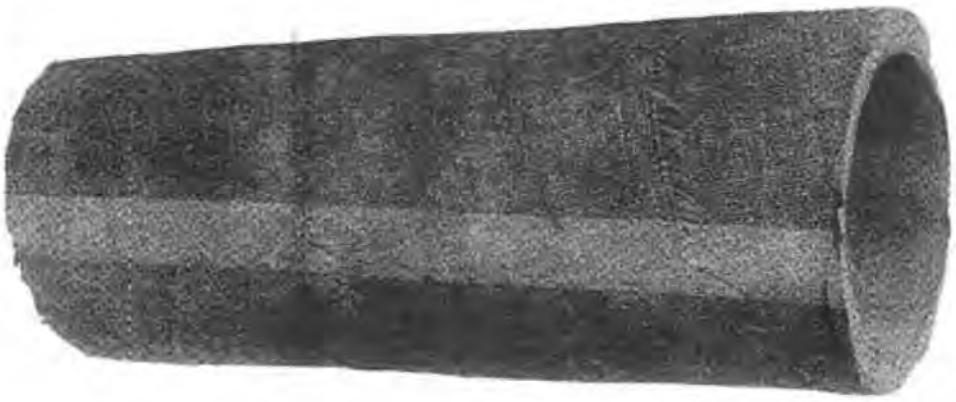
[redacted]

It is known that D 16 M indicates the U.S.S.R. standard aluminum alloy, which is similar to the U. S. 24S aluminum alloy. The meanings of the 2 above and the 1 below the D 16 M are not known. The 2 and the 1 may refer to the identification of the inspectors of the sheet at the rolling mill; to the gage, heat treatment, or external condition (bare or clad); or to some combination of these. It is to be noted that this mark is emplaced with an ink or an etchant and did not appear to distort or damage the surface of the metal. A metallurgical analysis of the aluminum-alloy sheet, predicted to be alloy 24S on the basis of the markings, proved it to be 24S.

Black rubber hose used in Soviet aircraft showed one white, one red, or two red longitudinal stripes (see Figure 12). These marks were thought to identify the application of the hose or the material in the hose, or both. Materials analyses showed that the hose with one white stripe were made of natural rubber and probably could not be used where oil resistance is required. The hose with one red stripe were composed of a synthetic rubber which can be used where some oil resistance is required. The hose with two red stripes were also made up from a synthetic rubber, but were capable of transmitting oil under high pressure. The synthetic rubber was identified as polychloroprene (neoprene).

[redacted]

[redacted]



80342

Figure 12. Soviet Rubber Hose Marked With One White Stripe.

The white stripe indicates either that this hose was made of natural rubber or that it is non-oil-resistant.

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6. Quality Mark

A series of marks observed on airframe, engine, and component parts could define the quality of the material or of the workmanship, or the degree of precision. Such marks were generally found in addition to the standard inspection marks, such as factory inspection, OTK, or ВП . For example, on the pistons of the Soviet M-11 engine, the mark (54) was observed (see Figure 13). This mark was stamped on the piston after some machining operation had been completed, but the OTK and factory inspection marks were stamped before the machining operation (see Figure 7, bottom). The OTK and factory inspection marks had been sand blasted, while the number 54 had not.

On another piston, it was observed that a portion of a large Russian letter P was partially machined down on one side (see Figure 13). Consideration was given to the possibility that when the P was stamped on, the piston was not held properly. However, it appears more likely that one part of the P was removed during machining. It may be that the large Russian P is the first letter of the word Расточить, which means "to machine down". Perhaps the piston was found to be oversize when it was inspected, was stamped accordingly, and then was remachined. After final machining, the piston may have been reinspected, found still to be oversize, and marked ББ (see Figure 13), a quality mark meaning oversize or "big big". This type of oversized piston could be used in cylinder barrels which had been refinished on the inside. The final quality inspection mark appears only on the finished surface.

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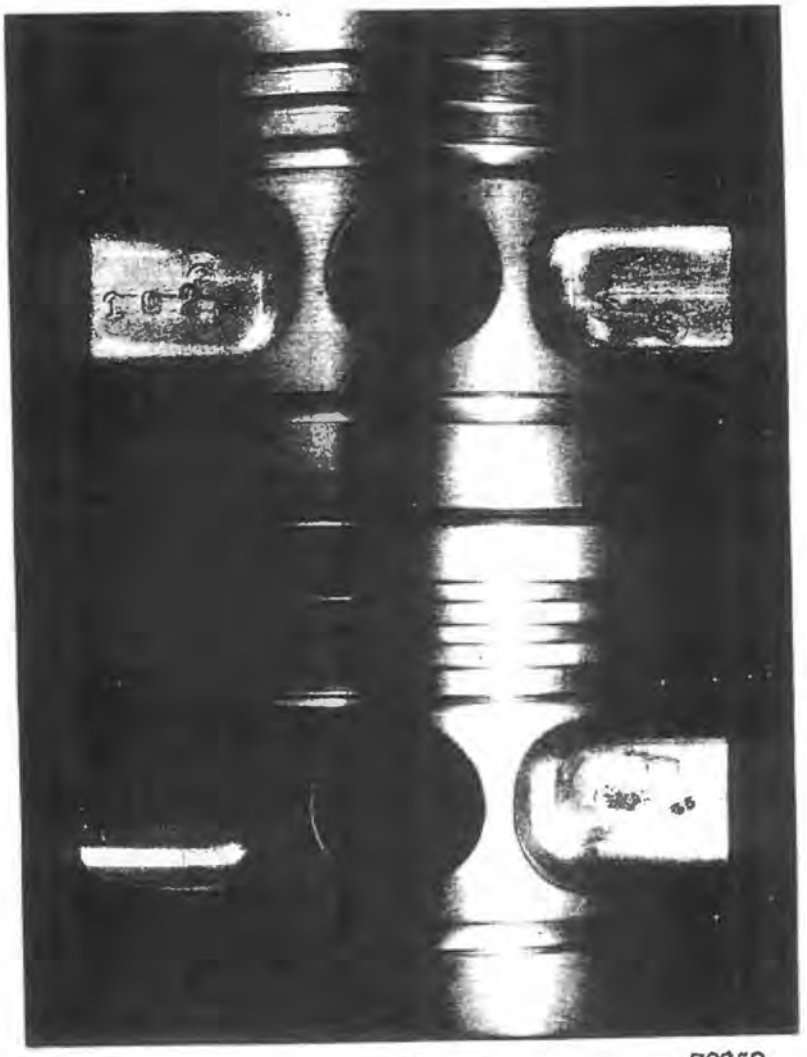

79859

Figure 13. Quality Marks on Soviet Pistons.

The top piston shows the (54), while the bottom piston shows the large P, small P, and the 55.

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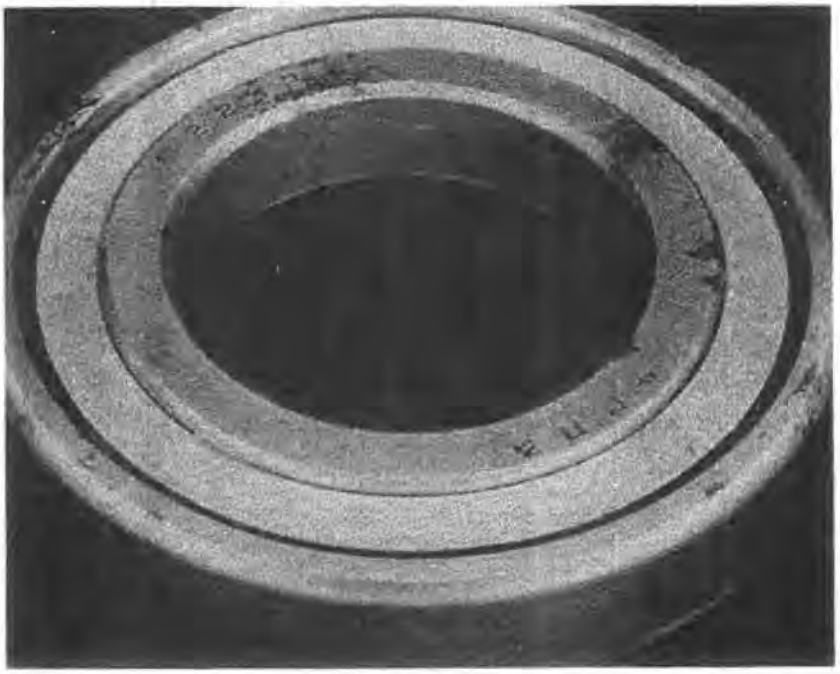
The team investigating markings has not agreed on this interpretation, but, nevertheless, believes that it should be presented here.

On a MIG-15 horizontal stabilizer, marks other than standard inspection marks were observed enclosed in triangles. The marks were $\frac{\text{XC}}{6}$ (Figure 5, bottom), $\frac{\text{XC}}{5}$, and $\frac{\overline{\text{X}\,\Gamma\,\text{C}}^{\,6}}{3}$ (Figure 10, bottom).

At first, these appeared to be materials marks. The parts marked with $\frac{\text{XC}}{5}$ and $\frac{\text{XC}}{6}$ were produced from steels which were identical in chemical composition, namely, containing 0.30 per cent carbon, chromium, manganese, and silicon; this steel can be identified by the U.S.S.R. designation 30 X Г C. Therefore, the $\frac{\text{XC}}{5}$ and $\frac{\text{XC}}{6}$ cannot be materials marks. The part which bore the mark $\frac{\overline{\text{X}\,\Gamma\,\text{C}}^{\,6}}{3}$ was made from a titanium-bearing stainless steel of the 18Cr - 8Ni type (similar to U. S. AISI 321); the Soviet designation for this type of alloy is 18Х9НТ. It is concluded, therefore, that the $\frac{\text{XC}}{5}$, $\frac{\text{XC}}{6}$, and $\frac{\overline{\text{X}\,\Gamma\,\text{C}}^{\,6}}{3}$ marks do not indicate types of materials. It is believed that X could stand for Хозяйственная (Economic), while the C could mean Секция (Section). The Г in the mark $\frac{\overline{\text{X}\,\Gamma\,\text{C}}^{\,6}}{3}$ may indicate Главная (Main), the main section of the quality-control organization for special alloys.

On ball and roller bearings, the Russian letter П or B often appears before the identification number of the bearing (see Figure 14). These seem to indicate the quality of the bearing, that is, П indicates a high-precision bearing, and B a higher precision bearing, while an A, not yet observed, would indicate the highest precision bearing. This



BMI 24A

Roller Bearing

79847

Roller Bearing

Figure 14. Bearing Quality Marks

In the upper left quadrant can be seen the numbers Π 2212 (top photograph), and in the bottom photograph B 7516. The Π bearing is a high-precision bearing. The B indicates a higher precision bearing.

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[redacted]

interpretation is supported by data obtained from the "Roll and Ball Bearing Catalogue of the U.S.S.R.", 1947 edition.

Quality marks have been observed on rubber tires and tubes. The quality of the rubber is indicated by the letters A, $\bar{B}$, or $\bar{\bar{A}}\bar{\bar{B}}$. It is assumed that first-quality rubber is marked A, second-quality $\bar{B}$, and an intermediate quality $\bar{\bar{A}}\bar{\bar{B}}$. Another mark observed on rubber, COPT, may also be indicative of first-quality rubber (see Figure 15).

The analyses and evaluations of the rubber in the tires and tubes have not been completed as yet. The data developed by these analyses may confirm or reject these quality-mark assumptions.

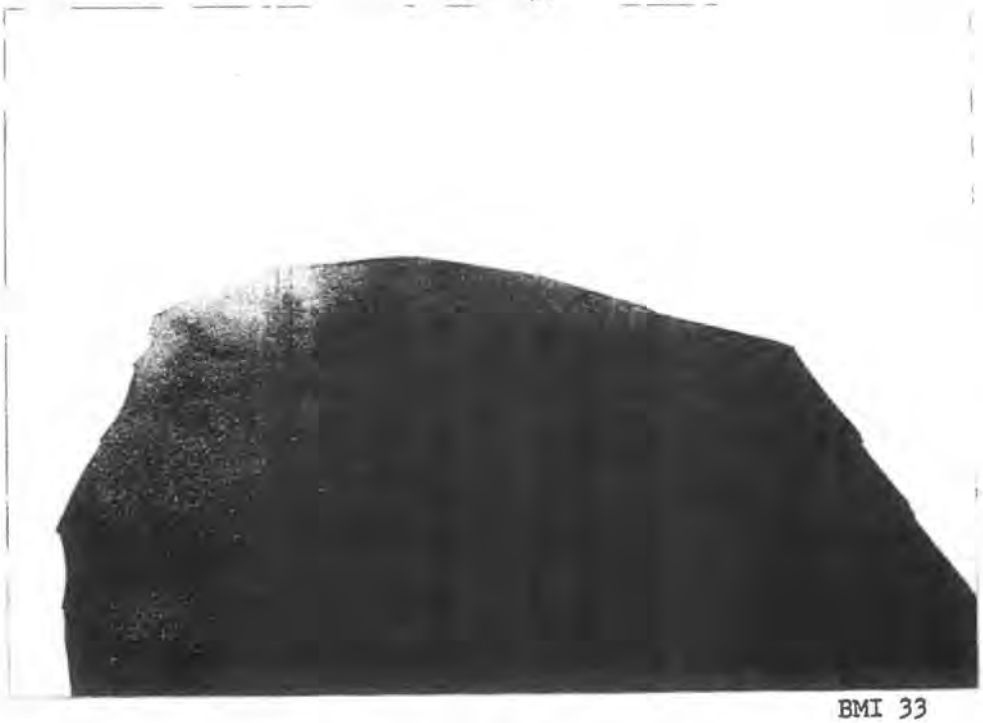
7. Assembly-Direction Marks

It has been observed that component parts, particularly the housings, carry directions for proper assembly into larger units. For example, the upper and lower components of a housing were identically marked with a number or letter. In some cases, the numbers used corresponded to the last two or three digits of the serial number.

A Type P-7A propeller-governor housing bore the serial number 1128606. Both the upper and lower parts of this propeller-governor housing carried the markings 606.

A Type P-7E propeller-governor housing contained the serial number C903A1557. The mark 57 was observed on both the upper and lower parts of the housing.

[redacted]



BMI 33

Figure 15. Soviet Rubber Quality Marks.

In the box marked OTK, the expression COPT 1A appears. This is possibly a quality mark.

Главное Управление Военно Воздушными Силами
General Direction Army Air Force

Красной Армии
Red Army

Принято
Accepted

This is a special mark.

51S-108019

Exp (b)(3) 10 USC 130B,
Exp (b)(6)

[redacted]

One other P-7A-type propeller-governor housing had the entire serial number on both parts of the housing (see Figure 16).

An engine-driven air compressor provides still another example of how the parts had been marked for assembly. The compressor had a 22 stamped on both the upper and lower parts of the main housing (see Figure 16).

From interpretation of these markings, it is believed that each part of such accessories had not been mass produced, and the parts were not interchangeable.

8. Special Marks

A series of inspection marks which did not fall into any of the other categories was noted on precision instruments. For example, the mark 

was observed on an altimeter. This may mean:

Военно Воздушные Силы
↓ ↓ ↓
Army Air Forces,

while the BC may indicate

Воздушная Секчия
↓ ↓
Air Section.

On a generator for a tachometer, the mark 

was observed (see Figure 17). This mark is interpreted to refer to the Army Air Force, while КСЦ may represent Контрольный Слунебный Центр , which means Control Inspection Center.

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Exp (b)(3) 10 USC 130B,
Exp (b)(6)

[redacted]

79847

79863

79851

Figure 16. Typical Soviet Assembly-Direction Marks.

Top picture (Type P-7A propeller governor) shows use of entire serial number.

Center picture (Engine-driven air compressor) shows use of a partial serial number.

Bottom picture shows precision machined parts with serial number etched in by electric pencil.

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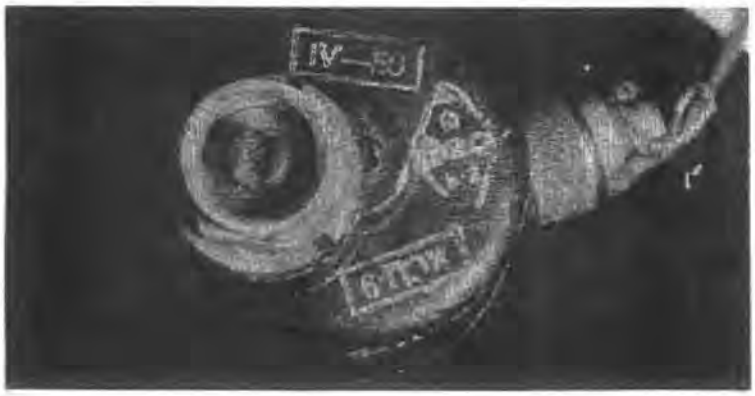


79853

Figure 17. Special Markings on a Soviet Tachometer Generator.

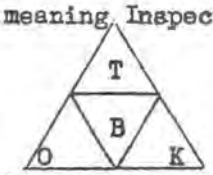
Notice the use of Roman numerals with Arabic numbers IV - 50 . This is probably the date: April, 1950.

[redacted]

[redacted]

On the same tachometer was the mark 

, which could be Контроль Электрической Промышленности, meaning Inspection of Electric Appliance Industry.

On a manifold pressure gage, the mark 

was noted. This is interpreted to mean Отдел Военного Технического Контроля, which is translated as Section of Military Technical Control.

Special marks have been defined as those placed on special types of components, such as instruments, by agencies whose mission is not clearly understood (see Figure 15). Perhaps as more data become available, some of the marks classified as special marks will be reclassified.

NB:ec
April 25, 1952

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[redacted]

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