U. S. AIR FORCE

PROJECT RAND

RESEARCH MEMORANDUM

ANALYSIS OF THE DEMAND PATTERNS FOR B-47
AIRFRAME PARTS AT AIR BASE LEVEL

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SUMMARY

1. The nature of demand for aircraft spare parts plays an important role in the design of an efficient logistics system. It is also important in the studies being conducted at RAND on the effects upon the logistical system of varying stockage policies, requisitioning frequencies, and pipeline time. This report contains a statistical study of the demand for B-47 airframe items (sub-property class 01A-FE) based on experience at March Air Force Base over the period March 23 to September 26, 1953.

2. Both the daily demand for individual kinds of items and the daily combined demand over all items show more variation than expected from the Poisson distribution, which was used as the theoretical model of demand. Since the Poisson distribution is the mathematical way of describing events that occur randomly over time, this would indicate that the demand for aircraft spare items at base level is highly erratic and difficult to predict.

3. There are only 12 kinds of items out of a total of 470 which had a sufficient number of days with demand to permit adequate statistical evaluation of the pattern. The proportion of days on which each of these kinds of items had a demand of one or more agrees fairly satisfactorily with the Poisson distribution if the daily data are grouped into two and three day periods, and the days with high unusual quantities of demand (greater than 10) are excluded. The lengths of these periods appear to be related to the flight and maintenance cycle of the aircraft.

4. The combined demand exhibits unusually high variation even when the data are grouped into two and three day periods. This appears to be due to the tendency of demand for different items to cluster together. If the different items are classified by price, the high priced items (above $500) have a combined demand which may follow the Poisson distribution. This indicates

that the demand for high priced items is independent of each other, and occurs randomly over time. The lower priced items still exhibit the clustering tendency and their combined demand deviates significantly from the Poisson distribution.

5. These results indicate that if the Poisson distribution is used to represent the demand pattern for spare items because of its mathematical convenience, the actual distribution for either individual items or combined may be more extreme, in that the variance of the distribution will be greater than the mean value of demand.

ANALYSIS

This paper presents the results of a statistical analysis of the pattern of demand for B-47 airframe spare items. The data used in this study were obtained from the Oklahoma City Air Materiel Area, and consist of the quantities of each B-47 peculiar airframe spare item (sub-property class 01A-FE) demanded daily at March Air Force Base over the period March 23 to September 26, 1953. The B-47 peculiar airframe items constitute one of the more important groups of items used in the maintenance of the B-47.

The data used for this study are unique in that demand includes not only the quantity of each spare part demanded that could be supplied from available base stocks, but also the quantity that was not available. Obviously, the latter type of demand is equally important in measuring the frequency and pattern of demand, since one of the major purposes of our logistics research is to determine how to minimize the occurrence of the latter type of demand situation in as efficient and economical manner as possible.[1] These data have only recently become available through a special report used at March and MacDill Air Force Bases for the B-47 and KC-97 aircraft assigned there.[2] Thus, demand as used in this and related studies includes all requests made for aircraft spare items needed for immediate use, regardless of whether base stocks were sufficient to meet the demand.

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[1] In classifying demand at March Air Force Base, Code 1 was used to identify issues made directly to the aircraft from available supplies, and it also includes issues from bench, dock, and shop stocks used in repair of airframe items. Code 5 was used to designate items demanded but not available for issue, and represents a due-out or back-order requisition.

[2] The USAF Worldwide Stock Balance and Consumption Report contains data on "issues", which differ from demand as used in this study in two respects: (1) it reports a demand only when the stock is available to meet it and (2) it includes demands that do not represent immediate needs, i.e., anticipatory requests.

Since the demand for spare items is the exogeneous element which drives a large part of the logistics system, it is important that we learn as much about its characteristics as possible. We have been unable to locate any published or unpublished studies of this type within the Air Force. Also, since it is inevitable that we will not study the demand pattern for each spare item, it is very desirable that we attempt to distill from representative demand data those characteristics and patterns which are generally valid and important for all aircraft spare parts. If we can accomplish this, then we may obtain a good deal of insight into the underlying causal elements that are responsible for the variation in demand, and thereby we will have a sounder basis for formulating and evaluating possible desirable changes in logistics policies and systems.

This analysis covers only a limited number and type of aircraft spare items. It covers the B-47 airframe items (sub-property class 01A-FE) demanded at March Air Force Base over a 6 month period during March - September 1953. Consequently, the representativeness of the findings in this study can be assessed only as additional research of this type is performed on an expanding and wider scale. We believe that this type of fundamental examination is very necessary in forging a solid basis for logistics research and policy.

Our initial hypothesis of the demand pattern for aircraft spare items was that the daily demand for individual spare items tends to be distributed in a Poisson distribution. That is, if λ is the average quantity of one kind of spare item[1] demanded per day, then the probability or proportion of days that

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1 By a "kind of spare item" we mean an item having a particular stock number which identifies it in the USAF Supply Catalogue. It is the pattern of demand for such a particular kind of item that we are analyzing in this paper. In other words, on how many days this kind of item is demanded once, twice, etc. The quantity of demand of an item measures the number of times a particular kind of item was demanded.

a quantity of x units of the item will be demanded is given by:

$$p(x) = e^{-\lambda} \frac{\lambda^x}{x!}$$

This is an attractive hypothesis because it means that only one parameter, λ, need be estimated to establish the frequency distribution of demand for a particular kind of item. Previous studies on aircraft spare items in England and on related materiel[1 2] in America had reported affirmative results in using the Poisson distribution. It therefore seemed reasonable to use this form of distribution as a point of departure, and to determine how the observed frequency distributions compare with it. If the Poisson distribution is applicable, it means that the probability of demand for the spare item is uniform over time.

There was a demand at March Air Force Base during this period for 470 different kinds of airframe items (i.e., items with different stock numbers). Of these 470 kinds of items, 240 were requisitioned only once during the 6 months period, and then the request was for an issue of just one item. In all, we could select only 12 of the 470 kinds of airframe items which had sufficient frequency and quantity of demand to permit adequate study of the demand pattern for individual items.

Thus, these 12 items were not a random or representative sample of parts demanded. However, by combining the findings from these individual kinds of items with the pattern of combined demand for all kinds, we were able to get an overall measure of the demand patterns. Interestingly, these 12 kinds of items range from a five cent washer to a boost unit assembly with a unit cost

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1 A Note on Spares Stock Travel Requirements Consequent Upon Air Freighting, Memo #17, Scientific Advisors Department, Air Ministry, March 1950.

2 "An Analysis of Some Failure Data", D. J. Davis, Journal American Statistical Association, vol. 47, 1952, p 113.

of more than $800.

The frequency distributions of daily demand for the 12 kinds of items are shown in Table 1. These distributions appear to be of the same general form. They are all characterized by a high degree of positive skewness, with a long tail of the curve on the right. This means that there were a number of days in which the demand for each kind of item was much above average. Such a shape is generally consistent with the concept of a Poisson-type distribution. However, an objective statistical test is necessary for sound evaluation of the hypothesis. It is important to note that the number of days with zero demand for each kind of item was computed by subtracting those days on which some demand occurred from the total number of days. There were only four Sundays in the 27 week period which reported any demand; hence, Sundays were omitted from the study. Three Legal holidays occurred during the period, so that in all, the period studied includes a total of 159 days. The significance of this assumption is discussed below.

The mean daily quantity of demand and the accompanying variance[1] for each of the 12 kinds of items are shown in Table 2.[2] The mean quantity of demand

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[1] The variance is a measure of the extent to which the observations deviate from the mean value. It is important in this paper, since the Poisson distribution has the characteristic that the mean and variance are equal.

[2] These were computed excluding days on which the quantity of demand was greater than 10 on grounds that these days represented demands of an unusual nature that the supply system is not normally expected to handle. In actual operation, the supply system now calls on emergency procedures, such as expedited deliveries, and priority actions to handle situations of very high demand. Such occurrences were only 23 out of 1908 possible. (159 days for each of 12 kinds of items.)

per day ranges from .13 to .76 among the 12 items. The variances are all higher than the mean values, particularly for item #4, #5, and #9.[1] It is obvious that these variances are highly sensitive to items falling in the right tail of the distribution, since days with zero demand represent nearly 90 per cent of the total number of days. The very low mean quantity of demand per day for these 12 items indicates that a daily time unit is probably too fine for measuring the demand rates for 01A-FE parts. Nine of the twelve kinds of items show an average demand of only one part every 2 to 4 days, and the large accompanying variance reflects the great instability of the average daily demand figures.

While fitting the frequency distribution of daily demand for each kind of item with the Poisson distribution we observed that the actual number of days with zero demand shown in Table 1 greatly exceeded the number expected. Since the number of days with zero demand was arbitrarily set as described above, we decided to use the data themselves to help us determine the appropriate number of days with zero demand. We therefore formulated the following alternative assumption: assume that the opportunity for demand occurs every m days, rather than every day. In other words, perhaps each day does not provide an opportunity for demand, since the aircraft is not flown each day, and therefore maybe it is not inspected or maintained each day. We thus can postulate that demand can occur with a cycle of m days. From cycle to cycle, the opportunity for demand is uniform, as provided by the Poisson distribution.

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[1] Although each of the 12 kinds of items has its individual stock number, for simplicity, in referring to them in this study we have assigned them each a number ranging from 1 to 12. Both numbers are used to identify the items in the tables.

We studied the quantity demanded within each cycle of m days rather than on every m-th day to allow for the possibility of spill-over or anticipatory demand in the period between every m-th day. This hypothesis leads to a 2 parameter representation of the frequency distribution for daily demand:

$$p(x = 0) = \frac{m - 1}{m} + \frac{e^{-m\lambda}}{m}$$

$$p(x = 1, 2, \ldots\ldots) = \frac{1}{m} \frac{e^{-m\lambda}(m\lambda)^x}{x!}$$

We then fitted these functions to each frequency distribution of daily demand for the 12 individual items, using the first two moments of the distribution to estimate m and λ. We found that an m of about 3 days appeared reasonable for most of the items. For two items, #6 and #7, the 2 day cycle gave a better fit. For describing the 3 day cycles, we used Monday through Wednesday of each week as one cycle, and Thursday through Saturday of each week as the other. For the 2 day cycles, we used Monday and Tuesday, Wednesday and Thursday, and Friday and Saturday as the periods.

For a part having a 3 day cycle, only 1/3 of the total number of days should be deemed to represent an opportunity for demand. We expect that the distribution of demand on these days would correspond closely to the distribution to be obtained by classifying the demand data in 3 day cycles, and both of these, in turn, should fit the Poisson distribution. We tested these hypotheses with the data for the 12 individual kinds of items. We found that the actual daily distribution, with the number of days of zero demand reduced by 2/3 of the total number of days, was not significantly different from the actual distribution of demand in cycles of days as shown in Table 3. Also, we found that the observed data arranged in 2 and 3 day cycles agreed fairly satisfactorily with the Poisson distribution, as shown by the data in the

Supplement to Table 3, if we group all demands of 1 and greater into a single class interval.

If we fit the Poisson distribution to the observed demand given in Table 3, allowing for individual class frequencies, we find that the χ^2 [1] values are significantly large. This is because there were too many days with large frequencies of demand, compared with Poisson distribution expectancy. Although the cause of this is not clear, it does indicate that observed demand has a greater variation than would be expected from the Poisson distribution, so that if the latter distribution is used to depict demand because of its convenient mathematical properties, the variation in demand obtained would be less than found in real life.

If we seek to interpret why the 3 day cycle seemed to fit the data fairly well, our most preferred hunch is that this correlates with the average number of 9 flights per month per aircraft observed at March Air Force Base over the period. That is, the cycle of demand for airframe spare items is correlated approximately with the cycle of flights. This seems reasonable because usually a pre-flight and post-flight inspection of aircraft is undertaken, and these probably generate an appreciable part of base maintenance, and resulting demand for spare items at base level.

Since only 12 kinds of items of the total number of 470 kinds could be studied individually, we felt that it would be useful to combine the demand data for all the 470 kinds of items to obtain more understanding of the overall pattern of demand. One interesting hypothesis to be explored is the following: if the demand for individual kinds of items is Poisson and independent, then the distribution of combined demand should also be Poisson. We used this as our initial working hypothesis.

It is clear that there is wide variation in the total daily demand for

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[1] The χ^2 values (Chi-square value) measures the extent of agreement between observed and expected demand as predicted by the Poisson distribution. A large χ^2 value means little agreement.

B-47 airframe items. This is shown in the daily time series tabulation (Table 4) and in the frequency distribution (Table 5). In about 25 per cent of the cases, the daily demand is for 5 items of all kinds or less; in 86 per cent of the cases it is for 30 items of all kinds or fewer; and approximately 14 per cent of the time, a demand for more than 30 items of all kinds per day will occur.

We began the study of the total demand for all kinds of items in the same way as did we for the individual items by examining the daily pattern first for Poisson characteristics. The mean daily total demand for 470 kinds of items is 17.3 items with a variance of 300.0. Using a Chi-square test to determine whether the difference in the estimates of the mean and variance of the daily total quantity of demand could have occurred by chance, we found that the difference between them is so significant (at much below the 1 per cent probability level) that we must reject the hypothesis that the daily distribution of total demand is distributed in a Poisson fashion.[1]

We then proceeded to the second stage of our analysis, as we had done with the individual kinds of items, and computed the total demand over all kinds of items using the 3 day cycle. This gave the distribution shown in Table 6. The mean total demand over all kinds of items for the 3 day cycle was 51.2 items per 3 days, and the variance was 942.8. The differences between the estimate of mean and variance is much greater than would be expected to occur by chance, so that we must reject the hypothesis that the total demand arrayed in 3 day cycles follows the Poisson distribution.[1]

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[1] The Chi-square index of dispersion showed that there was less than one chance in a hundred that the difference found between the mean and variance could have occurred by chance if they were equal. This test measures the extent to which the mean and variance are equal, aside from random effects, and whether the individual 3 day demand values are independent.

This result indicates that there must be lack of independence among the demand for the different kinds of spare items on a given day or within a given period. This is because if the demand for individual kinds of items is Poisson, then it must be that the demands for the different items occur in clusters, and this causes the large increase in the variance relative to the mean value of demand.

To explore this effect further, we decided to stratify the items on the basis of unit cost, and to study the pattern of demand within each stratum. We chose unit cost as the stratifying factor because we are primarily interested in high unit cost items, and because previous studies had shown an inverse relationship exists between the unit cost and quantity of demand of aircraft spare items.

We use the three standard Air Force cost categories as strata, and developed the frequency distribution of total demand for all items included in each of the following 3 cost categories: items with a unit cost of over $500, items having a unit cost of $10 - $500, and items having a unit cost under $10. Table 7 gives the frequency distributions of demand for each of the cost categories.

The distributions were then analyzed for Poisson character. The high unit cost category (items costing over $500) was almost Poisson,[1] deviating only significantly from the expected Poisson frequencies at the higher levels of demand. This result indicates that the demand for high unit cost items may be independent, and distributed randomly over time. This result seems reason-

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[1] The Chi-square value for goodness of fit between the observed distribution and the theoretical Poisson distribution was 12.9 for 4 degrees of freedom, which gives a probability value between 1 and 2 per cent. In making this test, we grouped frequencies for quantities of 5 and above in one class interval.

able since the demand for high unit cost items occurs comparatively infrequently, and when there is a demand for more than one kind of high unit cost items, it usually results from different causes. It will be interesting to observe whether this result for high unit cost items persists when additional demand data are studied at a later date.

The other two cost categories did not exhibit the Poisson characteristics even closely. The variance of their demand distributions were each much greater than their respective mean values, as can be seen in Table 7. This would indicate that the demand for the lower cost kinds of items occurs in clusters. Thus, the lower cost items are primarily used by the base maintenance shops, such as the armament, electronics, and accessory shops, for repair of larger and more expensive components and assemblies. These shops undoubtedly use a number of such lower cost items to repair each larger component. A similar pattern probably occurs in maintenance of aircraft at the flight line. This would help account for the clustering of demand of kinds of items in these two cost categories.

Thus, on the basis of data analyzed to date, there appears to be considerable variability in demand over time. We started with the hypothesis that the demand for aircraft spare items follows the Poisson distribution. If anything, the demand is even more extreme than might be indicated by the Poisson. We can obtain fairly satisfactory agreement with the Poisson distribution for estimating the proportion of days with some demand for the few individual items that had a sufficiently frequent demand for analysis, if we exclude days with demands in excess of 10, and if we group the data into 2 and 3 day cycles. The combined demand for high priced items (greater than $500) may be Poisson, but for lower cost items, the combined demand is not Poisson, because it appears that the demand for such items occurs in clusters. This latter result must be allowed for in statistical computations involving demand for lower priced items.

TABLE 1

Distribution of Daily Demand for Twelve B-47 Peculiar Airframe Spare Items

March Air Force Base, March 23, 1953 - September 26, 1953 (27 weeks - 159 day period)

Sub-Property Class 01A-FE[1]

Item No.	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
Stock No.	15-24377 -28	15-24377 -27	15-24377 -501	3-51879 -1	3-45550 -501	5-31915 -1	5-32234 -504	6-36713 -2	6-41005	9-23922 -1	9-25813 -1	6-39571 -1
Demand per day	No. of days	No. of days	No. of days	No. of days	No. of days	No. of days	No. of days	No. of days	No. of days	No. of days	No. of days	No. of days
0	136	138	146	142	145	113	106	143	134	146	145	126
1	14	19	7	2	5	14	37	6	4	4	9	5
2	4	1	4	1	3	9	10	7	3	6	3	10
3			1		1	8	2	2		1	2	4
4	2	1	1	3		5	1	1	3	2		5
5					1	1	1		5			3
6				1	1	4	1		2			2
7						1						
8				1		1			1			
9	1						1		3			
10					1							1
11												
12				2		1			1			
13	2					1						
14				1								
15				1								
16				1		1			1			
17												
18									1			
19				1								
20+				3	2				1			3

1 The line drawn between a demand value of 10 and 11 per day has been done to emphasize that demand in excess of 10 per day have been arbitrarily defined in this study as abnormally high. We are primarly interested in this study in analyzing the characteristics of "normal" demand that the supply system is expected to encounter. These exclusions represent 23 out of a total of 1908 possible occasions. Tables 2 and 3 which were computed from Table 1, also exclude these extreme demands.

TABLE 2

Mean Variance and Chi-Square Test of Frequency

Distribution of Daily Demand for the Twelve B-47

Peculiar Airframe Items

Item No.	Stock No.	Mean[1]	Variance[1]	χ^2 [2]	Degrees of Freedom	Test Result[3]
1	15 - 24377 - 28	.25	.86	12.4	1	P < .01
2	15 - 24377 - 27	.16	.22	.33	1	P > .05
3	15 - 24377 - 501	.14	.28	23.4	1	P < .01
4	3 - 51879 - 1	.20	.99	24.1	1	P < .01
5	3 - 45550 - 501	.22	1.14	25.3	1	P < .01
6	5 - 31915 - 1	.76	2.51	88.1	2	P < .01
7	5 - 32234 - 504	.54	1.29	10.2	2	P < .01
8	6 - 36713 - 2	.19	.39	25.2	1	P < .01
9	6 - 41005	.60	3.29	112.0	2	P < .01
10	9 - 23922 - 1	.17	.41	40.3	1	P < .01
11	9 - 25813 - 1	.13	.23	16.1	1	P < .01
12	6 - 39571 - 1	.60	2.25	86.1	2	P < .01

[1] Means and variances were calculated excluding days in which demand was greater than 10. This was done because it appears reasonable to assume that the system will never be geared to absorb routinely unusually high demands. We must expect that such observations will be treated in a special way by the supply system.

[2] Measures the extent to which the theoretical Poisson distribution fits the observed frequency distribution.

[3] The values shown in this column give the probability with which the sample of observations for each item could have come from a Poisson distribution. The very low probability values for virtually all items means that the data do not conform to the Poisson distribution.

TABLE 3

Distribution of Demand[1] for B-47 Airframe Spare Items Per Indicated Time

Period and Comparison of Observed with Expected[2] Demand Distribution

(March Air Force Base - Sub-Property Class 01A-FE - March 23 - September 26, 1953)

Part Number	#1 15 - 24377 - 28	#2 15 - 24377 - 27	#3 15 - 24377 - 501	#4 3 - 51879 - 1	#5 3 - 45550 - 501	#6 5 - 31915 - 1	#7 5 - 32234 - 504	#8 6 - 36713 - 2	#9 6 - 41005	#10 9 - 23922 - 1	#11 9 - 25813 - 1	#12 6 - 39571 - 1
Demand per Period	Observed 3 Day Cycle	Observed 3 Day Cycle	Observed 3 Day Cycle	Observed 3 Day Cycle	Observed 3 Day Cycle	Observed 2 Day Cycle	Observed 2 Day Cycle	Observed 3 Day Cycle	Observed 3 Day Cycle	Observed 3 Day Cycle	Observed 3 Day Cycle	Observed 3 Day Cycle
0	38	37	42	49	45	45	39	41	38	43	42	33
1	8	13	6	1	3	13	21	3	3	1	7	2
2	4	2	3	1	2	5	14	6	3	6	2	6
3		1	2		1	5	3	1		2	2	4
4	2		1	1		3		3		2	1	2
5					1	1			3			
6	1	1				2	2		1			1
7						2						2
8					1	3			1			
9	1					2	1		2			2
10				1	1		1		1			
11												2
12				1					1			
13												
14												
15+									1			
Sum	54	54	54	54	54	81	81	54	54	54	54	54
χ^2 Value	3.7	4.5	0.9	1.5	1.3	6.3	13.0	2.2	2.8	2.7	1.4	6.5
Degrees of Freedom	3	2	3	3	3	5	3	3	3	3	3	4
Probability[3]	.30	.10	.82	.68	.72	.28	$<$ .01	.50	.45	.45	.70	.16

1 The daily demand distribution was truncated at 10, i.e., days in which demand exceeded 10 were excluded from the computations. See Table 1.

2 The expected distribution was obtained by adjusting the daily demand for number of zeros as explained on p 6.

3 These values give the probability that as large or larger χ^2 would be obtained by chance if the two distributions are samples from the same population.

SUPPLEMENT TO TABLE 3

Results Obtained by Fitting the Modified Poisson (a Two Parameter Distribution)[1] to the Observed Demand of Table 3

Part No.	m	λ	λm	P(x = 0)	P(x = 1,2,3,...)	χ^2 for one degree of freedom	Probability Value[2]
#1	3	.25	.75	.8242	.1758	5.42	.02
#2	3	.16	.48	.8730	.1270	17.16	<.01
#3	3	.14	.42	.8857	.1143	6.22	.014
#4	3	.20	.60	.8496	.1504	1.41	.25
#5	3	.22	.66	.8390	.1610	0.01	.90
#6	2	.76	1.52	.6094	.3906	6.81	<.01
#7	2	.54	1.08	.6698	.3302	38.46	<.001
	1		.54	.5827	.4173	4.61	.03
#8	3	.19	.57	.8552	.1448	4.01	.04
#9	3	.60	1.80	.7218	.2782	0.09	.75
#10	3	.17	.51	.8669	.1331	2.33	.15
#11	3		.39	.8924	.1076	7.38	<.01
	2	.13	.26	.8855	.1145	0.90	.35
#12	3	.60	1.80	.7218	.2782	3.29	.08

1 $P(x = 0) = \frac{m-1}{m} + \frac{1}{m} e^{-\lambda m}$

$P(x = 1,2,3,\ldots\ldots) = \frac{1}{m} (\lambda m)^x \frac{e^{-\lambda m}}{x!}$

λ is mean demand per day

m is number of days in demand cycle

2 These values give the probability of obtaining as large or larger χ^2 by chance if the observed distribution is described by the modified Poisson distribution.

TABLE 4

Time Series of Total Daily Demand for B-47 Peculiar Air Force Items

(Sub-Property Class 01A-FE, March Air Force Base, March 23 - September 26, 1953)

		Daily Demand			Daily Demand			Daily Demand			Daily Demand			Daily Demand
Mar	23	3	May	01	18	Jun	11	11	Jul	22	50	Aug	31	22
	24	3		02	2		12	17		23	27			
	25	0		04	11		13	0		24	8	Sep	01	109
	26	1		05	11		15	45		25	25		02	14
	27	0		06	20		16	8		27	2		03	20
	28	1		07	9		17	13		28	4		04	46
	30	2		08	4		18	9		29	22		05	5
	31	6		09	2		19	22		30	10		08	1
				11	20		20	51		31	12		09	6
Apr	01	6		12	21		22	50					10	10
	02	14		13	39		23	16	Aug	01	1		11	51
	03	3		14	19		24	10		03	14		12	15
	04	3		15	25		25	8		04	43		14	11
	06	2		16	0		26	21		05	4		15	0
	07	7		18	43		27	9		06	22		16	12
	08	11		19	30		29	4		07	68		17	27
	09	5		20	11		30	34		08	4		18	1
	10	50		21	19					10	22		19	11
	11	8		22	24	Jul	01	9		11	15		21	3
	13	6		23	5		02	9		12	23		22	1
	14	26		25	25		03	8		13	15		23	3
	15	14		26	62		06	14		14	12		24	3
	16	8		27	16		07	5		15	2		25	9
	17	8		28	75		08	38		17	24		26	0
	18	3		29	19		09	30		18	17			
	20	58					10	12		19	28			
	21	7	Jun	01	57		11	0		20	43	Total		2764 items - 159 days
	22	12		02	13		13	9		21	24			
	23	18		03	10		14	23		22	5			
	24	2		04	21		15	7		24	11			
	25	2		05	9		16	11		25	24			
	27	13		06	0		17	28		26	63			
	28	38		08	30		18	15		27	11			
	29	17		09	22		20	17		28	42			
	30	14		10	43		21	15		29	3			

TABLE 5

Frequency Distribution of Total Daily Demand for

B-47 Peculiar Airframe Items

(Sub-Property Class 01A-FE)

Daily Demand			
Demand	No. of Days	Demand	No. of Days
0	8	24	4
1	6	25	3
2	8	26	1
3	9	27	2
4	5	28	2
5	5	29	0
6	4	30	3
7	3	34	1
8	7	38	2
9	8	39	1
10	4	42	1
11	10	43	4
12	5	45	1
13	3	46	1
14	6	50	3
15	5	51	2
16	2	57	1
17	4	58	1
18	2	62	1
19	3	63	1
20	3	68	1
21	3	75	1
22	6	109	1
23	2		

Total quantity of demand	2764 items
Total number of days	159 days
Mean demand per day	17.3 items
Variance	300.0

TABLE 6

Quantity of Demand Over All Kinds of Items Classified in 3 Day Period

(Sub-Property Class 01A-FE, March Air Force Base, March 23 - September 26, 1953)

	Quantity of Demand		Quantity of Demand		Quantity of Demand
Mar 23 - 25	6	May 25 - 27	103	Jul 27 - 29	28
26 - 28	2	28 - 30	94	Jul 30 - Aug 1	23
Mar 30 - Apr 1	14	Jun 1 - 3	80	Aug 3 - 5	61
Apr 2 - 4	20	4 - 6	30	6 - 8	94
6 - 8	20	8 - 10	95	10 - 12	60
9 - 11	63	11 - 13	28	13 - 15	29
13 - 15	46	15 - 17	66	17 - 19	69
16 - 18	19	18 - 20	82	20 - 22	72
20 - 22	77	22 - 24	76	24 - 26	98
23 - 25	22	25 - 27	38	27 - 29	56
27 - 29	68	Jun 29 - Jul 1	47	Aug 31 - Sep 2	145
Apr 30 - May 2	34	Jul 2 - 4	17	Sep 3 - 5	71
May 4 - 6	42	6 - 8	57	7 - 9	7
7 - 9	15	9 - 11	42	10 - 12	76
11 - 13	80	13 - 15	39	14 - 16	23
14 - 16	44	16 - 18	54	17 - 19	39
18 - 20	84	20 - 22	82	21 - 23	7
21 - 23	48	23 - 25	60	24 - 26	12

Total quantity of demand	2764 items
Total number of 3 day periods	54
Mean	51.2
Variance	942.8