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CENTER FOR NAVAL ANALYSES
ARLINGTON, VIRGINIA

JULY 1976

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SETTING MILITARY PAY BY CIVILIAN WAGE AND JOB COMPARISONS

CENTER FOR NAVAL ANALYSES
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Arlington, Virginia 22209
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JULY 1976

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The current "comparability" process for setting Federal civilian and military pay is described and evaluated. Special emphasis is given to shortcomings of this process with respect to setting military pay. The possibility of directly linking military pay to private enterprise pay is considered. Existing wage surveys are evaluated for this purpose, and a new survey of private sector pay is outlined. The appropriate techniques for using currently collected data, or data drawn from

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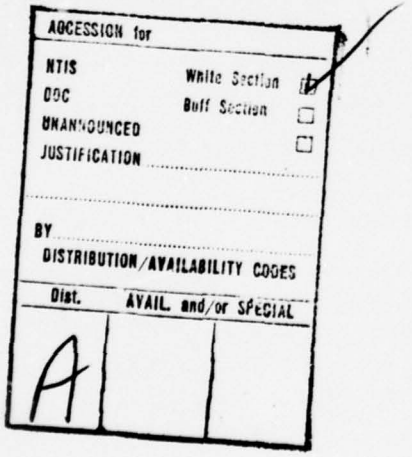
20 new surveys, are also discussed. In conclusion, the general problems of setting military pay and the principle of comparability are discussed and evaluated.



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1. Enclosure (1) is forwarded as a matter of possible interest.

2. It was written in January 1976. Since that time there have been the following three changes in the comparability calculation as it is described on pages 10-12 and in table 6. (See reference (a) for a full discussion of these changes.)

3. "Weighting" is employed in the process of estimating the "PATC payline" and the "General Schedule (GS) payline." For the PATC payline, this weighting occurs at two points in the process. First, the PATC average salaries for each GS grade are no longer simple averages of the salaries of surveyed jobs. They are weighted averages. Second, weighted regression is used to determine the payline that best fits these average salaries. The average salaries used to estimate the GS payline are calculated as before. However, now this payline is fitted using total GS employment at each grade as weights for the GS average salaries.

4. The intergrade differentials are no longer constrained as described on page 10 and in table 5. The "best" payline minimizes the sum of the squared deviations rather than the sum of the absolute deviations.

5. Unlike the 1974 and 1975 adjustments, the 1976 adjustment included PATC salaries for secretary and computer operator.

6. These changes probably represent an improvement in the process for setting General Schedule salaries. However, they do not necessarily improve the process for adjusting military pay.

7. Research Contributions are distributed for their potential value in other studies and analyses. They do not necessarily represent the opinions of the Departments of the Navy and Defense.

Herschel Kanter

HERSCHEL E. KANTER
Director
Institute of Naval Studies

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SETTING MILITARY PAY BY CIVILIAN WAGE AND JOB COMPARISONS

SUMMARY

Current law requires that military pay be annually adjusted by the same percent as the average annual percent change in Federal white-collar (General Schedule) pay. This change in General Schedule pay is the result of an annual "comparability" adjustment which is based on a survey of white-collar wages in private enterprise. This paper asks whether this current paysetting process will result in "comparable" wages for military personnel. If not, are there possible improvements to the process which would better serve the principle of comparability while ensuring a pay system that provides appropriate incentives for the attraction and retention of personnel?

The current Civil Service comparability process has been criticized on a number of grounds. It begins with an annual survey of private enterprise wages for professional, administrative, technical, and clerical personnel (the PATC survey) administered by the Bureau of Labor Statistics. The occupations included in the survey represent about one-fourth of the General Schedule work-force. Further, only 26 percent of the non-Federal white-collar labor force is covered by the PATC survey. In short, General Schedule pay is adjusted on the basis of an unnecessarily limited sample of salaries in the non-Federal sector. In addition, the salary data that is collected reflects average full-time basic pay rather than total compensation. Thus fringe benefits and the effects of overtime and unemployment are not captured by the PATC survey.

The current comparability process can also be criticized on the grounds that the PATC survey data may be used improperly. The annual pay adjustment is based on a comparison of the PATC data to current General Schedule pay. In making this comparison, however, PATC data representing very small fractions of the General Schedule work force is given equal weight with data representing much larger fractions of the work force. Also, the shape of the GS salary schedule (the differentials between General Schedule grades) is predetermined and not influenced by the results of the PATC survey. Finally, unusual and probably inappropriate statistical techniques are used when making the actual comparison between the PATC data and General Schedule salaries.

Many of these criticisms assume greater importance in the context of adjusting military pay. The PATC occupations represent less than 12 percent of the military work force. Also, the comparison between PATC and General Schedule salaries is made without reference to military pay considerations. In short, the current adjustment process will only accidentally result in either comparable or efficient military pay schedules. Improving the process for adjusting General Schedule pay would not greatly change the strength of this conclusion.

This suggests that the comparability principle would be better served by a direct link between military pay and pay in the non-Federal sector. Data from existing wage surveys might be used for this purpose. Unfortunately, given current collection and reporting procedures, only the results from the PATC survey and the area wage surveys (AWS) are suitable. They are the only surveys which are national in scope and provide data for occupations which represent significant fractions of the military work force.

The AWS results are a good supplement to the PATC results because the AWS includes many blue-collar occupations which have counterparts in the enlisted work force. Thus the PATC and AWS jobs together represent nearly 60 percent of the enlisted force (compared to less than 10 percent for the PATC alone). The AWS includes almost no jobs representative of the officer force, so the PATC's representativeness of slightly more than 20 percent would be virtually unchanged by inclusion of the AWS.

Despite this improvement, the PATC and area wage surveys are still not as representative of the military force as they might be. Large fractions of the military work force are not represented by any PATC or AWS jobs, and PATC and AWS occupations are, for the most part, surveyed at work-levels corresponding to the lower military pay grades (E-1 to E-5 and O-1 to O-3). Indeed, when pay grade is considered, the two surveys together represent only 32 percent of the enlisted work force and 21 percent of the officer force. Also, the two surveys do not measure total compensation and cover only a small fraction of the non-Federal labor force. In short, while the AWS complements the PATC survey, the two surveys together still have severe shortcomings.

Recent data from the two surveys can be used to illustrate the importance of appropriate representativeness. Wage indexes, weighted by the distribution of the military work force, were calculated for the enlisted force, the officer force, and the total military force for the period 1967-1973. Indexes based on PATC and AWS data together increase faster than indexes based on PATC data alone. This is a result of the fact that blue-collar wages have increased faster between 1967 and 1973 than have white-collar wages. This result should not be interpreted to mean that, because they were based on PATC, or white-collar, data, recent military pay increases have been too low. It does mean, however, that the representativeness of survey salary data can have an important effect on pay changes based on that data.

Given the defects of existing data, the possibility of designing new surveys was considered. Two surveys were outlined, based on the distribution of the military work force. The first could serve as a supplement to the PATC and AWS results. It (a "supplementary survey") should contain between 25 and 33 occupations. However, since it would be used in conjunction with the imperfect data from the two existing surveys, a supplementary survey is not as desirable as an entirely new survey. This second

survey (a "new survey") should include between 51 and 62 jobs. It should also be designed to better measure total compensation and cover a greater fraction of the non-Federal labor force than do the PATC and area wage surveys.

Neither the costs of implementing these surveys nor the time it would take would be prohibitive. Even with better coverage than the PATC survey, the "new survey" should cost less than $10 million and take no more than two to three years to design and implement. Nevertheless, private employers may be reluctant to cooperate with the administration of additional surveys of this scope. However, the recommended number of survey jobs is an upper limit, so the likelihood of this objection is somewhat lessened. (If employer recalcitrance proves to be a problem, though, several indexing alternatives are possible.)

Use of a new survey would answer many of the criticisms of the current process which is the basis for adjusting military pay. A new survey could be highly representative of the military work force, better cover the non-Federal labor force, and measure total compensation more accurately. Unfortunately, it would not answer more basic criticisms of the principle of comparability itself.

Because comparability, as it is understood and implemented today, does not permit consideration of either the supply of or demand for labor, comparable wages need not result in an efficient compensation system. That is, comparable pay may be either too high or too low in terms of attracting and retaining personnel of the desired quantity and quality.

These issues are especially important when establishing military compensation levels. Military working conditions (meaning such things as responsibility, riskiness, arduousness, hours of work, and likelihood of unemployment) often differ so much from those in the civilian sector that "comparable" wages may or may not be "appropriate" or "efficient" wages. The best that can be said for a comparability calculation is that it represents a starting point for determining an efficient compensation system.

INTRODUCTION

Changes in military pay currently are linked to changes in Federal white-collar, or General Schedule, pay. In particular, military pay is increased the same percent as is General Schedule pay. The General Schedule pay change, in turn, is based on the results of a survey of private enterprise pay in some 20 white-collar occupations. This entire procedure is founded on the principle that Federal pay be "comparable" to private enterprise pay.

In this context, "comparability" means that Federal employees should receive the same pay as their counterparts in the private sector who are doing similar work. This principle applies equally to military pay. Since military pay is only indirectly linked to private enterprise pay (through the General Schedule) it is natural to ask whether the current process serves the comparability principle in the military case, and whether a direct link between military and private enterprise pay would be preferable or possible.

There are several reasons why this question is particularly important today. Two separate study groups, the Quadrennial Review of Military Compensation and the Defense Manpower Commission, have responsibility for a comprehensive review of the military pay system. Among the questions they are addressing is this issue of comparability and the appropriate method for adjusting military pay. In addition to these groups, the President's Panel on Federal Compensation has recently completed a review of the mechanisms used for setting the pay of all Federal civilian employees. This Panel has recommended changes to the comparability system which may lessen the desirability of the link between military and General Schedule pay. In short, changes in the method of setting military pay are likely. It is therefore important that these changes be based on a full understanding of the current methods and the likely effects of possible changes. This paper is designed to serve these purposes.

The next section of the paper describes the current comparability process and evaluates it, with special emphasis on its effects and shortcomings with respect to setting military pay. The following section considers the possibility of directly linking military pay to private enterprise pay. For this purpose, both the use of currently collected data and the possible construction of new surveys of private enterprise pay are considered. The appropriate form of and techniques for using such data are discussed. Finally, the paper concludes with a more general discussion of some of the problems involved in setting military pay. This discussion includes an evaluation of the comparability principle itself.

THE CURRENT COMPARABILITY PROCESS

INTRODUCTION

Currently, the annual adjustment in military pay is the product of a two-step process. First, changes in the Federal Civil Service salary schedule are calculated. These changes are those necessary to maintain "comparability" with private industry pay. The average increase in pay which these changes represent is then applied to basic pay, and the quarters and subsistence allowances (BAQ and BAS), to generate the new military pay schedules. Thus, for example, if the annual increase in Civil Service pay represents an average increase in pay of 5 percent, basic pay, BAQ, and BAS are each also increased 5 percent for all pay grades and length-of-service categories.[1]

The link, then, between military pay and civilian industry pay, is an indirect one. To understand the current linkage between military and civilian industry pay it is therefore necessary to first study the linkage between Civil Service pay and civilian industry pay.

THE COMPARABILITY ADJUSTMENT FOR GENERAL SCHEDULE PAY[2]

The PATC Survey

The annual comparability adjustment begins with a national survey of pay in selected professional, administrative, technical, and clerical occupations. This survey

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[1] Regular Military Compensation (RMC) is a measure of military compensation which includes basic pay, BAQ, and BAS, and the value of the tax advantage of the allowances (which are tax-free). In practice, the pay raise is implemented by increasing basic pay, BAQ, and BAS by the same percent as the increase in Civil Service pay. In the example given, basic pay, BAQ, and BAS would all be increased 5 percent. The increase in basic pay will move some individuals into higher income tax brackets and thus the value of the tax advantage will increase more than 5 percent. In other words, for some individuals, a 5 percent increase in basic pay, BAQ, and BAS will represent a greater than 5 percent increase in RMC.

[2] References 1, 2, 3, and 4 together, with some hard work, give a good understanding of the comparability process. The author's understanding of the process was aided considerably by discussions with personnel at the Bureau of Labor Statistics and Civil Service Commission.

(termed the PATC survey) is administered annually by the Bureau of Labor Statistics.[1] Twenty occupations are surveyed, all but one of them at more than one work level for a total of 84 occupation-work level combinations. Table 1 lists the occupations and work levels currently surveyed.

The survey itself is administered so that the data reflect a reference period of March.[2] Pay is surveyed at a number of establishments meeting industry and size criteria. Table 2 lists the industries surveyed and the minimum establishment size for each industry. Establishments in those industries which met the minimum size criteria employed 20,278,000 persons in 1974, or less than 25 percent of total non-agricultural civilian employment.[3] Of the 29,205 establishments which met the criteria in table 2, 3,199 were surveyed in 1974.[4]

For each occupation-work level combination, data from the various establishments is combined by weighting individual establishment results to generate unbiased estimates of the national average salary. Each occupation-work level combination is associated with a given General Schedule (GS) grade. A private industry average salary is then computed by taking a simple average of the salaries at each GS grade. Table 3 presents these figures for the 1974 PATC survey. Note that no jobs are surveyed to represent GS grades 16, 17, and 18. This is the result of a failure to develop a generally accepted method for collecting nationally representative rates for work equivalent to these higher grades. There are also no jobs currently surveyed which correspond to GS-10.

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[1] See reference 5, particularly the appendixes, for a detailed description of the survey and its methodology.

[2] This has been true since the 1972 survey. Prior to 1972 the reference period was changed several times and reflected reference periods between "Winter" and June of the survey year.

[3] Reference 5, p. 33 and reference 6, p. 276. Non-agricultural civilian employment in 1974 was 82,443,000.

[4] Reference 5, p. 33. Establishments are chosen to produce a random, stratified sample of the total population.

TABLE 1

OCCUPATIONS AND WORK LEVELS INCLUDED IN PATC SURVEY

Occupations	Number of Work Levels
Professional and Administrative	
Accountant	5
Auditor	4
Chief Accountant	4
Attorney	6
Buyer	4
Job Analyst	4
Director of Personnel	4
Chemist	8
Engineer	8
Sub-total	47
Technical Support	
Engineering Technician	5
Drafter	4
Computer Operator	6
Sub-total	15
Clerical	
Keypunch Supervisor	5
Clerk, Accounting	2
Clerk, File	3
Keypunch Operator	2
Messenger	1
Secretary	5
Stenographer	2
Typist	2
Sub-total	22
Total	84

Source: Reference 5. For job definitions, see reference 5, Appendix C.

TABLE 2

INDUSTRY AND MINIMUM EMPLOYMENT REQUIREMENTS
FOR INCLUSION IN PATC SURVEY, 1974

Industry	Minimum Employment in Establishments in Scope of Survey
Manufacturing	250
Nonmanufacturing:	
Transportation,[1] communication, electric, gas, and sanitary services	100
Wholesale Trade	100
Retail Trade	250
Finance, insurance and real estate	100
Services (engineering and architectural services; and commercially operated research, development, and testing laboratories only)	100

[1]Limited to railroad, local and suburban passenger, deep sea water (foreign and domestic), and air transportation industries.

TABLE 3

AVERAGE PRIVATE INDUSTRY SALARIES ASSOCIATED WITH EACH GENERAL SCHEDULE GRADE, 1974

Occupation-Work Level Surveyed by BLS	Average Annual Private Industry Salary
GS-1	
Clerks, file (I)	$ 5,109
Messengers	5,643
Average	5,376
GS-2	
Clerks, file (II)	5,647
Keypunch operators (I)	6,440
Typists (I)	5,810
Average	5,966
GS-3	
Clerks, accounting (I)	6,607
Clerks, file (III)	6,928
Drafter-tracers	7,048
Engineering technicians (I)	7,975
Keypunch operators (II)	7,492
Keypunch supervisors (I)	8,842
Stenographers, general	6,954
Typists II	6,751
Average	7,325
GS-4	
Clerks, accounting (II)	8,367
Computer operators (I)	6,879
Drafters (I)	8,507
Engineering technicians (II)	9,122
Keypunch supervisors (II)	9,547
Secretaries (I)	7,601
Stenographers, Senior	7,900
Average	8,275

TABLE 3 (Cont'd)

Occupation-Work Level Surveyed by BLS	Average Annual Private Industry Salary
GS-5	
Accountants (I)	$ 9,739
Auditors (I)	10,352
Buyers (I)	10,073
Chemists (I)	10,660
Computer operators (II)	7,632
Drafters (II)	10,443
Engineers (I)	11,901
Engineering technicians (III)	10,491
Job analysts (I)	9,783
Keypunch supervisors (III)	11,005
Secretaries (II)	8,221
Average	10,027
GS-6	
Computer operators (III)	8,887
Keypunch supervisors (IV)	12,809
Secretaries (III)	8,742
Average	10,146
GS-7	
Accountants (II)	11,549
Auditors (II)	12,024
Buyers (II)	12,141
Chemists (II)	12,408
Computer operators (IV)	10,279
Drafters (III)	13,070
Engineers (II)	13,171
Engineering technicians (IV)	11,974
Job analysts (II)	11,488
Keypunch supervisors (V)	13,552
Secretaries (IV)	9,568
Average	11,929
GS-8	
Computer operators (V)	11,098
Secretaries (V)	10,396
Average	10,747

TABLE 3 (Cont'd)

Occupation-Work Level Surveyed by BLS	Average Annual Private Industry Salary
GS-9	
Accountants (III)	$ 13,285
Attorneys (I)	14,223
Auditors (III)	14,371
Buyers (III)	14,659
Chemists (III)	14,298
Computer Operators (VI)	12,403
Engineers (III)	15,160
Engineering technicians (V)	13,654
Job analysts (III)	13,921
Average	13,997
GS-11	
Accountants (IV)	16,051
Attorneys (II)	16,357
Auditors (IV)	17,491
Buyers (IV)	17,421
Chemists (IV)	17,283
Chief Accountants (I)	17,601
Directors of personnel (I)	15,790
Engineers (IV)	17,929
Job analysts (IV)	17,263
Average	17,021
GS-12	
Accountants (V)	19,560
Attorneys (III)	21,082
Chemists (V)	20,702
Chief accountants (II)	20,072
Directors of personnel (II)	18,815
Engineers (V)	20,654
Average	20,148
GS-13	
Attorneys (IV)	25,956
Chemists (VI)	24,079
Chief accountants (III)	23,805
Directors of personnel (III)	24,078
Engineers (VI)	23,827
Average	24,349

TABLE 3 (Cont'd)

Occupation-Work Level Surveyed by BLS	Average Annual Private Industry Salary
GS-14	
Attorneys (V)	$ 31,999
Chemists (VII)	28,203
Chief accountants (IV)	29,021
Directors of personnel (IV)	28,140
Engineers (VII)	26,960
Average	28,865
GS-15	
Attorneys (VI)	38,180
Chemists (VIII)	34,475
Engineers (VIII)	31,469
Average	34,708

Source: Reference 5, pp. 68-69.

The salaries in table 3 are just that -- normal straight-time salaries, based on a normal work schedule. They include incentive earnings and cost-of-living payments but exclude overtime earnings, nonproduction bonuses and fringe benefits.

BLS estimates very low sampling errors for most of the occupation-work level combinations. Sampling error information is shown in table 4.

The Comparability Calculation

The averages for each of the GS grades listed in table 3 are those used for the actual comparability calculation.[1] The first step in the calculation is to estimate a "payline" from those averages. This payline is a regression line fitted to the averages in table 3. However, it is not a statistical regression line in the usual sense of the term: the line's "slope" is constrained; and the criteria used to judge goodness of fit are not the traditional ones.

The constraint on the payline's slope serves the purpose of maintaining "regular decreasing intergrade differentials." What this implies for the relation between various General Schedule grades is shown in table 5. The second and third (percent) differences between grades are predetermined: they must be those shown in table 5. The GS-1 salary (the "intercept") and the intergrade differentials (first differences) are varied to find the payline which best meets the goodness-of-fit criteria. Thus, for example, if the "best" payline has a differential between GS-1 and GS-3 of 28.0 percent (rather than the 28.4 percent shown in the example of table 5), the differential between GS-3 and GS-5 will be 2.1 percentage points less, or 25.9 percent (= 28.0 - 2.1). The differential between GS-5 and GS-7 would be 1.9 percentage points less than 25.9 percent, or 24.0 percent, and so on.

The "best" payline is chosen on the basis of two criteria. First, the algebraic sum of the percent deviations of the PATC salary data from the estimated payline must equal zero. Second, the sum of the absolute values of the percent deviations must be

[1] For 1974 and 1975 the averages for GS-6 and 8 were not used. Their inclusion would have resulted in significantly lower pay increases for those years and were excluded from the calculation at the insistence of the Federal Employees Pay Council. They were excluded on the grounds that the job definitions for "computer operator" and "secretary" (which were new in 1974) were producing "unreliable data." The salaries for computer operator and secretary were excluded at the other general schedule grades as well. See reference 1.

TABLE 4

SAMPLING ERRORS FOR PATC SURVEY, 1974

Sampling Error	Number of Occupation-Work Levels
Less than 2%	51
2-4%	24
4-6%	3
6-8%	6

Source: Reference 5, p. 35.

TABLE 5

GENERAL SCHEDULE INTERGRADE DIFFERENTIALS

GS Grades	Intergrade Differential (1st Difference)	Second Difference	Third Difference
GS-1 to GS-3	28.4%		
		2.1	
GS-3 to GS-5	26.3		0.2
		1.9	
GS-5 to GS-7	24.4		0.2
		1.7	
GS-7 to GS-9	22.7		0.2
		1.5	
GS-9 to GS-11	21.2		0.2
		1.3	
GS-11 to GS-12	19.9		0.2
		1.1	
GS-12 to GS-13	18.8		0.2
		0.9	
GS-13 to GS-14	17.9		0.2
		0.7	
GS-14 to GS-15	17.2		0.2
		0.5	
GS-15 to GS-16	16.7		0.2
		0.3	
GS-16 to GS-17	16.4		0.2
		0.1	
GS-17 to GS-18	16.3		

minimized. In other words, the estimated payline is a regression line which minimizes the sum of the absolute value of the deviations, rather than the traditional least squares regression which minimizes the sum of the squared deviations.

This "private enterprise (PATC) payline" is then compared to a "General Schedule payline." Prior to 1973, the General Schedule payline was the step 4 rate of every General Schedule grade. Beginning with the 1973 comparability calculation, the General Schedule payline has been based on the weighted average salary paid to all employees at every grade. That is, a payline is estimated using average General Schedule salaries and the same methodology as that used for estimating the private enterprise payline.

The General Schedule and private enterprise paylines are then compared. The percent difference between them at each grade is the percent increase in each General Schedule grade rate necessary to achieve comparability. The entire comparability calculation for 1974 is presented in table 6.[1]

CRITICISMS OF THE COMPARABILITY ADJUSTMENT

The current comparability process has been criticized on a number of grounds. These criticisms generally fall into two categories: criticisms of the PATC survey itself, and criticisms of the way the PATC data is used. Many of the shortcomings of the comparability process have been discussed in detail elsewhere.[2] Therefore, discussion of them will be as brief as possible, with special note made of those that have particular importance for the issue of adjusting military pay.

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[1] Ordinarily, the "new" rates in column 8 of table 6 would be the basis for the new General Schedule salaries. Because the use of a General Schedule payline yielded lower pay increases than the step 4 reference method, its use was introduced over a three-year period. In 1973 and 1974 the comparability calculation was done both ways and the actual increase was a compromise between the two calculated increases. In 1974, the new method produced an average increase in pay of 4.94 percent (the average of the numbers in column 6, table 6). The old method produced an increase of 6.69 percent. The actual increase adopted in 1974 was 5.52 percent, or two-thirds of the way between 6.69 and 4.94. In 1973 the actual increase was one-third of the way between the increases generated by the old and new methods. In 1975 the new, or "dual payline," method was fully implemented.

[2] See references 2, 3, and 7. The forthcoming report of the staff of the President's Panel on Federal Compensation is also expected to have detailed criticisms of the comparability process.

TABLE 6

COMPARABILITY CALCULATION FOR 1974

General Schedule Grade (1)	Private Enterprise (PATC) Payline: PATC Average Salaries (2)	Private Enterprise (PATC) Payline: PATC Payline (3)	General Schedule Payline (1974): General Schedule Average Salaries (4)	General Schedule Payline (1974): General Schedule Payline (5)	Percent Difference Between PATC & GS Paylines (6)	Old GS Step 1 Rates (7)	New GS Step 1 Rates (8)
GS-1	$ 5,376	$ 5,813	$ 5,113	$ 5,546	4.82%	$ 5,017	$ 5,258
GS-2	5,966	6,594	5,859	6,290	4.84	5,682	5,956
GS-3	7,325	7,451	6,916	7,107	4.84	6,408	6,720
GS-4	8,689	8,382	8,108	7,994	4.85	7,198	7,547
GS-5	10,494	9,394	9,186	8,958	4.87	8,055	8,447
GS-6	-	10,486	10,403	9,998	4.88	8,977	9,414
GS-7	12,375	11,666	11,251	11,122	4.89	9,969	10,456
GS-8	-	12,930	12,743	12,326	4.90	11,029	11,571
GS-9	14,196	14,288	13,736	13,619	4.91	12,167	12,766
GS-10	-	15,736	15,437	14,998	4.92	13,379	14,037
GS-11	17,021	17,285	16,586	16,472	4.93	14,671	15,395
GS-12	20,148	20,686	19,709	19,709	4.96	17,497	18,365
GS-13	24,349	24,529	23,355	23,365	4.98	20,677	21,706
GS-14	28,865	28,865	27,431	27,490	5.00	24,247	25,459
GS-15	34,708	33,765	32,328	32,149	5.03	28,263	29,684
GS-16	-	39,329	-	37,438	5.05	32,806	34,461
GS-17	-	45,691	-	43,485	5.07	37,976[a]	39,904[a]
GS-18	-	53,037	-	50,465	5.10	43,926[a]	46,165[a]

[a]Actual rates limited to $36,000.

Source: Column 2: Averages from table 3 (excluding secretary and computer operator at all GS grades).
Column 3: Constrained regression on column 2 (reference 1, p. 14).
Column 4: Reference 1, p. 14.
Column 5: Constrained regression on column 4 (reference 1, p. 14).
Column 6: Percent difference between column 5 and column 3.
Column 7: General schedule salaries effective October 1, 1973.
Column 8: ([Column 6] x [Column 7] ÷ 100) + Column 7.

The PATC Survey

The PATC survey has been criticized on the grounds that it does not accurately represent pay in private enterprise and that the occupations surveyed are not sufficiently representative of the General Schedule work force. The information in table 2 is the basis for the first of these criticisms. Establishments and workers in most non-manufacturing industries are excluded from the survey, and among the industries included, only establishments of moderate and large size are surveyed. As noted earlier, the establishments eligible for inclusion in the survey employ only about 25 percent of the total employed civilian labor force. This need not be a problem, of course, if the excluded establishments and industries do not have salary schedules which differ greatly from those that are included. There is reason to doubt that this is the case, however.

First, it is widely believed that small firms pay lower wages than do larger firms. If so, this implies that the salaries from the PATC survey are biased upwards. Second, non-profit organizations (such as hospitals) and state and local governments are excluded from the PATC survey. They, too, probably pay lower wages than the establishments which are surveyed. This is a particularly important point because these organizations will have a large number of occupations which are comparable to General Schedule jobs. The numerical importance of these exclusions is shown in table 7. The PATC survey reaches only 25.7 percent of the non-Federal white-collar employment. Over 25 percent is excluded by the establishment size criteria, and excluding non-profit organizations and state and local government eliminates another 31 percent of the possible survey universe.

Even more important, however, is the criticism that the occupations in the PATC survey are not representative of the General Schedule work-force. The Civil Service Commission has calculated that the PATC occupations represent only 26 percent of the General Schedule work force.[1] As tables 8 and 9 show, however, the PATC survey is far less representative of the military work force. Only 9.9 percent of the enlisted force and 22.1 percent of the officer force is represented by PATC occupations. In short, military pay is adjusted on the basis of salary data for occupations which represent only 11.5 percent of the total force. Further, these figures actually overstate the relation of PATC occupations to military jobs: 15 percent of the officer force is "represented" by <u>one</u> PATC occupation ("engineer"); and only two of the nine major DOD enlisted occupation groups, and four of the eight major DOD officer occupation groups, are represented by PATC occupations.[2]

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[1] See reference 7.

[2] See references 5, 8, and 9; and tables 15 and 16 below.

TABLE 7

WHITE-COLLAR EMPLOYMENT BY INDUSTRY, 1971

	Employment (Millions)	Percent of Total
PATC Industries	14.4	51.4%
Included	7.2	25.7
Excluded by Establishment Size Criteria	7.2	25.7
Other Industries	4.9	17.5
State & Local Government	6.2	22.1
Non-profit Organizations	2.5	8.9
Total Non-Federal (Excluding Self-Employed)	28.0	100.0

Source: Reference 2, p. 28

TABLE 8

REPRESENTATIVENESS OF PATC OCCUPATIONS,
ENLISTED FORCE

PATC Occupations	DOD Enlisted Occupation Group	Percent of Total Force
Drafters	Drafting (413)	0.1%
	Illustrating (414)	0.1
Chemist Engineer	Scientific and Engineering aides (44)	0.1
Job Analyst	Personnel, General (500)	2.4
Stenographer File Clerk Messenger Typist Secretary	Administration (51)	5.6
Computer Operator Keypunch Operator	Data Processing-Operators/Analysts (531)	0.8
Accountant Auditor Accounting Clerk	Accounting, Finance, Disbursing (54)	0.8
TOTAL		9.9

Source: PATC Occupations from reference 5. DOD Occupation Groups from reference 8. Figures were taken from the individual service master personnel records as of 30 June 1974.

TABLE 9

REPRESENTATIVENESS OF PATC OCCUPATIONS,
OFFICER FORCE

PATC Occupations	DOD Officer Occupation Group	Percent of Total Force
Engineer	Engineering and Maintenance Officers (4)	15.0%
Chemist Engineer	Physical and Mathematical Scientists (5A)	0.8
Attorney	Lawyers (5F)	1.5
Director of Personnel	Manpower & Personnel (7C)	2.2
Accountant Auditor Chief Accountant	Comptrollers and Fiscal (7D)	1.3
Computer Operator	Data Processing and Statistics, 0-1 and 0-2 only (7E)	0.4
Buyer	Procurement and Production (8D)	0.9
TOTAL		22.1

Source: PATC Occupations from reference 5. DOD Occupation Groups from reference 9. Figures were taken from the individual service master personnel records as of 30 June 1974.

Related to the issue of representativeness is the objection that the PATC survey does not measure total compensation. As noted earlier, the PATC survey collects data on total straight-time salaries only, but employees in both private enterprise and the government receive substantial retirement and fringe benefits. This would not be a problem if the ratio of salary to total compensation moved together for both government and non-government employees. This is not likely to be true, however. As table 10 shows, benefits, as a percent of basic pay, have recently increased faster for federal civilian employees than for private employees. The principal cause of this faster increase is improved retirement benefits for federal employees. The PATC survey also fails to account for expected unemployment or overtime pay.

Finally, the General Accounting Office (GAO) has raised doubts about the accuracy of the PATC survey results themselves.[1] This is in addition to the issues mentioned above. BLS calculates sampling errors, but there is no effort to determine the existence or extent of non-sampling errors (basically, those arising from incorrect job matches). However, GAO presents some anecdotal evidence that non-sampling errors do occur (and it is hard to imagine their complete absence).

The Comparability Calculation

The comparability calculation has been criticized on two grounds: first, that PATC survey results are weighted incorrectly (both within GS grades and when fitting the payline); and second, that the shape of the payline is inappropriate. In determining the average private enterprise salary comparable to each GS grade, each surveyed occupation is given equal weight. Thus, for example, the GS-5 average salary is a simple average of eleven occupation averages. Of these, only two are clerical positions (18.2 percent), yet clerical personnel represented 62.8 percent of GS-5 employment in December 1973. Six of the eleven GS-5 occupations (54.5 percent) are professional or administrative positions, yet professional and administrative personnel represented only 7.0 percent of GS-5 employment.[2]

In other words, the average private enterprise salary for each GS grade is an average for a nonexistent population. It is not the average salary in private enterprise (which is the average that would be obtained were occupation averages weighted by private enterprise employment). It is also not the average salary Federal employees would receive in the private sector (the average that would be obtained were occupation averages weighted by Federal employment).

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[1] See reference 2, pp. 37-56.

[2] See reference 7, appendix C. This situation is even worse for 1974 and 1975 when one of the two clerical occupations at GS-5, "secretary," was not included in the average.

TABLE 10

EMPLOYEE BENEFITS AS A PERCENT OF BASIC PAY, SELECTED YEARS

Year	Federal Civilian Employees	Private Employees
1966	23.8%	24.5%
1968	24.3	25.1
1970	27.8	26.6
1972	32.1	28.7

Source: Reference 10, p.28. Benefits include pay for leave time (excluding sick leave), health and insurance programs (including sick leave), retirement programs, unemployment programs, bonuses and awards, and savings and thrift plans. The estimates were prepared by BLS.

When the paylines are fit to the salary data, each grade bears equal weight. Thus a deviation from the payline at GS-1 has the same influence in determining the "best" payline as does a deviation at any other grade. Yet, for example, GS-1 employment amounts to only 0.3 percent of total General Schedule employment while GS-5 employment represents 13.3 percent. In other words, the current methodology considers a deviation at GS-1 (that is, under or over-paying GS-1s) as "bad" as a deviation at GS-5.

These criticisms of the current weighting procedures (equal weighting) have, of course, equal applicability for the adjustment of military pay. More appropriate weighting (such as weighting each PATC occupation-work level combination by its Federal employment) would answer these criticisms, but still be a system that has little applicability to the military case. Only a direct link between the PATC survey results and military pay would eliminate this weighting problem for the military case.

As noted earlier, the estimated paylines are constrained to satisfy a pattern of "regular decreasing intergrade differentials." This is the result of a compromise between two conflicting principles of comparability. The first of these is that pay distinctions should be maintained in keeping with work and performance distinctions. The second principle is that Federal salary rates should be comparable with private enterprise rates for the same level of work.

Satisfying the second principle, only, would be quite simple: Calculate the private enterprise salary rate for each GS grade (as in table 3 or by some appropriate weighting scheme) and adjust Federal pay accordingly. Merely satisfying the second principle, however, need not satisfy the first principle, which has often been interpreted to imply constant intergrade differentials. The PATC survey would only accidentally produce constant differentials and would probably result in yearly changes in the differentials. Hence, the payline approach was adopted.

Estimating a payline does not eliminate hard choices, however. A functional form for the payline must still be chosen. A linear functional form yields constant intergrade differentials in dollar terms, while an exponential form yields constant intergrade differentials in percent terms. Neither of these forms fits the PATC data very well, and the line currently in use represents a compromise between them: it fits the data somewhat better than either but does not have constant intergrade differentials. It has <u>increasing</u> differentials in dollar terms, but <u>decreasing</u> differentials in percent terms.

A fourth curve, the Nassimbene line,[1] has also been considered. It fits the PATC data better than the current line, but does not produce constant intergrade differentials. Its differentials (in percent terms) are decreasing but at an irregular rate.

As the preceding discussion should suggest, the choice of functional form for the payline is inherently arbitrary. One's choice of functional form will depend on the answer to three questions about the purpose of comparability and the Federal salary schedule: (1) Should Federal pay be set at a level which insures attraction and retention of personnel of appropriate quality? (2) Should pay be set to maintain equality with the private sector for comparable jobs? and (3) Should pay be set to maintain "equity" among persons at different work levels (constant intergrade differentials)? The current process represents a compromise which attempts to answer all three questions affirmatively and consequently answers none.

The choice of payline, of course, will affect the size of each year's pay adjustment. Since the military pay adjustment is simply the average percent increase in the General Schedule, the choice of payline also affects the military pay increase. Whatever payline is chosen, however, its use need not result in a pay increase that is appropriate for the military case. The "correct" answers to the questions in the preceding paragraph may be different for the military case than for the General Schedule case. If so, military pay considerations are of no help in determining the appropriate form of the payline.

In addition to criticisms concerning weighting of observations and the shape of the payline, the comparability calculation can also be criticized on statistical grounds. First, the payline is fit by minimizing the sum of the absolute errors (the deviations from the payline) rather than by the more standard technique of minimizing the sum of the squared errors (least squares). Which method is more appropriate depends on the error distribution of the underlying data. If the errors are distributed normally with mean zero (as seems likely), then the current technique will result in inefficient estimates of the payline.[2]

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[1] After Raymond Nassimbene, a former Bureau of the Budget employee. This curve is a variant of the exponential form.

[2] "Inefficient" here means that the estimated payline is unnecessarily far from the "true" payline. The current estimation procedure may also lead to biased estimates of the payline. See reference 11 and its bibliography for a discussion of some of the problems and properties of least absolute error estimation.

If least squares is used an additional problem arises. Because percent sampling errors are apparently not correlated with occupation or work level (see reference 5), the absolute sampling errors increase with increases in salary. Fitting a least squares line to data with this property will lead to unbiased but inefficient estimates of the payline. Measuring deviations in percent terms will lessen this problem but not eliminate it, because the data used for estimation is within-grade averages. These within-grade averages are based on different numbers of occupations (see table 3), so the percent sampling error of the within-grade average is not constant across all grades.

Finally, the issue of weighting can also be viewed as a statistical question. If the payline should merely reflect pay in private enterprise, then observations should be weighted by private enterprise employment. This, however, could result in significant under or overpayment of substantial fractions of the General Schedule workforce. What is required, then, is some (mathematical) statement of the "costs" of errors of this type with an appropriate weighting system based on these costs. Such a weighting system would probably more nearly reflect Federal employment than private enterprise employment.

The current comparability calculation does not adequately reflect these statistical considerations. Information (or various assumptions) on the error distribution of the data could be combined with precise statements of the costs of various kinds of payline estimation errors to derive the appropriate estimation technique. While this might result in a technique that is less appealing (in terms of intuition or simple self-interest) to Federal employees and unions, it would also very likely be more accurate and statistically valid .

CONCLUSION

The current comparability process has a number of defects for adjusting General Schedule pay, and these defects are magnified when the adjustment of military pay is considered. The PATC survey is even less representative of the military work force than it is of the General Schedule work force. The comparability process does not necessarily bear any relation to what military pay should be. In sum, the annual adjustment in military pay has no necessary connection to the principle of comparability. It is merely an adjustment which can conceivably result in serious under or overpayment of military personnel, relative to "comparable pay."

Despite these shortcomings, it can still be argued that the current comparability system is not without virtue. Its principle advantage is that it represents a well understood, tested, automatic procedure for adjusting pay; and this procedure has a great deal of intuitive appeal to Federal employees and the Congress. No doubt, much of this appeal rests with the current system's simplicity, and many of the objections to the current process are, in fact, the result of this simplicity. Thus, eliminating many of the criticisms discussed above might well reduce the general acceptance of the process.

Decreased appeal might result in an increase in the political nature of the pay-setting process. Though it is a very political process today, setting Federal pay is nevertheless far less political than it was before adoption of the comparability principle. Indeed, a major reason for adopting comparability was to lessen the involvement of Congress in the process, and replace a system where Federal pay was adjusted only in response to real or perceived crises.

This argument probably applies with equal force to the military case. The current process has resulted in regular adjustments to military pay that, in the view of most military personnel, have at least kept pace with increases in Federal civilian and private sector pay. The remainder of this paper discusses changes in the comparability process for military pay. These changes would better serve the comparability principle, hopefully without lessening the credibility and equity the current system has in the eyes of many civilian and military personnel.

IMPROVING THE COMPARABILITY PROCESS

INTRODUCTION

As the preceding discussion should suggest, the current process of adjusting military pay is only loosely connected to the principle of comparability. Changing the current methodology for adjusting General Schedule pay in response to the criticisms discussed above need not strengthen this connection. A PATC survey that is more representative of the civil service work force would probably not be much more representative of military jobs than is the current survey. Altering the payline methodology would not necessarily reflect military pay considerations either. In short, paying more than mere lip service to the principle of military pay comparability to the private sector requires a direct link between civilian private enterprise pay and military pay. That requires civilian wage data that is more representative of the military work force than is the PATC data and a methodology for using that data.

EXISTING WAGE SURVEYS

The most direct way of increasing the representativeness of the PATC data is by supplementing it with data drawn from other existing wage surveys. This section describes the major wage surveys administered by BLS or other Federal agencies. It evaluates their usefulness for the purpose of directly linking military pay to private enterprise pay. This evaluation is in terms of several criteria which a wage survey should satisfy if it is to be useful for this purpose.

Because the military competes for manpower on a national basis, private enterprise salary data should be national in scope. That is, the data should produce, or be capable of producing, national salary averages. For the same reason, the survey's coverage should be as wide as possible. For example, exclusion of data on the grounds of industry definition or establishment size should be minimized. Because pay adjustments should be made on a regular basis, data used for this purpose should be available at regular intervals. Customary practice suggests that the survey should thus be an annual one. Finally, of course, the survey should reach occupations that have counterparts in the military work force.

The PATC Survey

Despite the shortcomings of the PATC survey, it is still an excellent beginning. It is not representative of a large fraction of the military work force, but virtually all the occupations surveyed do correspond to military occupations. It produces national salary averages and is administered on an annual basis. Its coverage in terms of industry and establishment size is not ideal but that may well change. The General Accounting Office has recommended expanding the scope of the survey (see reference 2) and the President's Panel on Federal Compensation has made similar recommendations (see reference 12). If adopted, these changes would significantly expand the industry coverage of the PATC survey.

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The Area Wage Surveys[1]

The Bureau of Labor Statistics conducts area wage surveys (AWS) annually in 85 Standard Metropolitan Statistical Areas (SMSAs) in the United States (excluding Alaska and Hawaii). The AWS program provides data on wages or salaries for 44 occupations, and information on supplementary wages and some fringe benefits as well. Table 11 lists the occupations currently surveyed.

A comparison of table 11 to table 1 shows that while there is some overlap between the AWS and PATC survey,[2] most jobs in the AWS are different from those included in the PATC survey. Like the PATC jobs, most of the AWS jobs have reasonably close counterparts in the military. The AWS thus suggests itself as a supplement to the PATC survey for the purpose of adjusting military pay.

The AWS has merit for this purpose on other grounds as well. The data from the individual areas is combined to create a national average salary or wage for each occupation. Not all SMSAs are surveyed (there are 229 SMSAs in the United States) and not all establishments within each survey area are included. However, establishments and areas are chosen, and the data from them is weighted, so that the calculated national average is an unbiased estimate of the average salary for each occupation across all SMSAs.

The AWS also has extensive establishment and industrial coverage. Surveyed establishments are drawn from six major industry divisions: manufacturing, transportation, communication, and other public utilities; wholesale trade; retail trade; finance, insurance and real estate; and selected services. (The principal exclusions are the mining and construction industries and government.) Within these industries, all establishments with over 50 employees are eligible for inclusion in the survey.[3]

In short, the AWS appears to satisfy the criteria listed above for use in adjusting military pay. It is conducted annually, it has wide industrial and establishment coverage, and it produces national average salary data (although only for SMSAs).

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[1] See reference 13 and its appendixes for a detailed description of the area wage surveys, their methodology, and job descriptions of the occupations surveyed.

[2] There are nine occupations that appear in both surveys. Seven of these have identical job descriptions in the two surveys. See table 11.

[3] In the 12 largest SMSAs only establishments with 100 or more employees are surveyed in the manufacturing, public utilities, and retail trade industries.

TABLE 11

OCCUPATIONS AND WORK LEVELS INCLUDED IN AREA WAGE SURVEYS

Occupations	Number of Work Levels
Office	
Biller, machine (billing machine)	1
Biller, machine (bookkeeping machine)	1
Bookkeeping-machine operator	2
Clerk, accounting**	2
Clerk, file**	3
Clerk, order	1
Clerk, payroll	1
Keypunch operator**	2
Messenger**	1
Secretary*	4
Stenographer**	2
Switchboard operator	2
Switchboard operator-Receptionist	1
Tabulating-machine operator	3
Transcribing-machine operator	1
Typist**	2
Professional and Technical	
Computer operator*	3
Computer programmer, business	3
Computer systems analyst, business	3
Draftsman**	4
Electronics technician	1
Nurse, industrial (registered)	1
Maintenance and Powerplant	
Carpenter, maintenance	1
Electrician, maintenance	1
Engineer, stationary	1
Fireman, stationary boiler	1
Helper, maintenance trades	1
Machine-tool operator, toolroom	1
Machinist, maintenance	1
Mechanic, automotive (maintenance)	1
Mechanic, maintenance	1
Millwright	1
Painter, maintenance	1
Pipefitter, maintenance	1
Sheet-metal worker, maintenance	1
Tool and die maker	1
Custodial and Material Movement	
Guard and Watchman	1
Janitor, Porter, or Cleaner	1
Laborer, material handling	1
Order filler	1
Packer, shipping	1
Shipping and Receiving Clerk	1
Truckdriver	1
Trucker, power	1

* Included in PATC survey.
** Included in PATC survey and with identical job definition for both surveys.

SOURCE: Reference 12, Appendix B.

The Service Contract Surveys

The Service Contract Surveys are administered by BLS for the use of Employment Standards Administration of the U.S. Department of Labor (DoL). The results are used to make wage determinations under the Service Contract Act of 1965. The DoL also uses the results of the AWS for this purpose and the Service Contract Surveys are designed to fill gaps in the AWS.[1] These surveys, then, are just small area wage surveys. They are not used to generate national averages of any kind and are merely supplemental to the AWS. In other words, they are of little use for the purpose of adjusting military pay.

The Federal Wage System ("Wage Board") Surveys

The salaries of Federal white-collar workers are adjusted by the comparability process described above. The wages of Federal blue-collar ("wage board") workers are determined by a different process. Unlike General Schedule employees, wage board employees are paid under different salary schedules depending on the local area of the country in which they work. The schedule for each local area is determined by an annual process that is analagous to, but not quite the same as, the comparability process for the General Schedule.[2] Of interest here is the wage and salary data that is used in this process.

The U.S. Civil Service Commission has the general responsibility for administering the Federal wage system. In practice, however, it delegates the responsibility for determining salary schedules in each local area to the Federal agency which is the area's largest wage board employer. In most areas this leading agency is the Department of Defense.

In each local area, the leading agency administers the wage survey on which the annual pay adjustment is based. The Civil Service Commission and the BLS provide the job descriptions which are used in all areas. The leading agency then surveys private enterprise establishments in the appropriate area to determine the "prevailing rate" for a number of representative occupations. (Sampling procedures and establishment weights are developed by BLS.) These prevailing rates are then used to determine each local area's wage board salary schedules.

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[1] The Service Contract Act requires Federal contractors to pay "prevailing rates" to their employees. The AWS provides estimates of these prevailing rates for the 85 SMSAs surveyed. For other areas, and industries or jobs not included in the AWS (food services, for example), the Service Contract Surveys provide the prevailing rate estimates.

[2] Reference 14 contains a description of the comparability process for the Federal wage system. It also has detailed descriptions of the jobs which are surveyed and the methodology used for the wage board surveys. There are currently about 130 separate local areas in the Federal wage system.

As they are currently administered, the results of the various wage board surveys are not combined to generate national average salaries for the surveyed occupations. In principle, though, they probably could be. Since BLS determines the sampling procedures for each area, the data they use for doing so could presumably also be used to derive appropriate weights for generating national averages. These national averages might then be used for the purpose of directly linking military pay to civilian private enterprise pay.

However, the occupational composition of the wage board surveys does not warrant this. Table 12 lists the occupations currently surveyed. The "required" jobs are surveyed in every area and the "optional" jobs are surveyed in areas where they represent significant numbers of wage board employees. Of the 22 required jobs, only three (maintenance laborer, welder, and electronics mechanic) have no obvious counterparts in the area wage surveys. Thus, national averages of wage board occupations would, at best, improve information already available from the AWS.

Although none of the "optional" jobs in table 12 are included in the AWS, they represent only a small fraction of the military work force. Producing national averages for these jobs (if it could be done) would therefore probably not be worth the effort of doing so. In short, the wage board surveys do not produce data which usefully supplements that produced by the AWS.

Industry Wage Surveys

The Bureau of Labor Statistics administers industry wage surveys on a recurring three to five-year cycle for about 70 industries. For some industries, regional or national wage estimates are produced. For the purposes of adjusting military pay, these surveys are of little use. They are not done annually (most industries are surveyed every five years) and for many industries or jobs, national averages are not available.

Union Wage Scales[1]

The Bureau of Labor Statistics also collects data on union wage scales and hours for selected occupations in five highly unionized industries. This data, too, is of little use for present purposes. The five industries included are building construction, local transit, trucking, printing, and retail groceries. Only the first of these, construction, has many jobs which have significant numbers of military counterparts. Further, the data collection is not national but applies only to 68 cities with populations of 100,000 or more.

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[1] A description of this data and a description of the industry wage surveys described above, can be found in reference 15, pp. 6-7.

TABLE 12

OCCUPATIONS INCLUDED IN FEDERAL WAGE SYSTEM SURVEYS

Occupations	Wage Grade Equivalence[1]
Required:	
Janitor (Light)	WG-1
Janitor	WG-2
Material Handler	WG-2
Maintenance Laborer	WG-3
Packer	WG-4
Helper (trades)	WG-5
Warehouseman	WG-5
Forklift Operator	WG-5
Material Handling Equipment Operator	WG-5
Truckdriver (Medium)	WG-6
Truckdriver (Heavy)	WG-7
Machine Tool Operator II	WG-8
Machine Tool Operator I	WG-9
Carpenter	WG-9
Electrician	WG-10
Auto Mechanic	WG-10
Sheet Metal Mechanic	WG-10
Pipefitter	WG-10
Welder	WG-10
Machinist	WG-10
Electronics Mechanic	WG-11
Toolmaker	WG-13
Optional:	
Aircraft Structures Assembler	WG-7
Aircraft Structures Assembler A	WG-9
Aircraft Mechanic	WG-10
Electrician, Ship	WG-10
Pipefitter, Ship	WG-10
Shipfitter	WG-10
Shipwright	WG-10
Machinist, Marine	WG-10
Cable Splicer (Electric)	WG-10
Electrical Lineman	WG-10
Electrician (Powerplant)	WG-10

[1]The "wage grade" is analagous to the general schedule grade. Wage grades WG-1 through WG-4 are considered "unskilled" jobs, WG-5 through WG-8 are "semiskilled", and WG-9 through WG-15 are "journeymen". Two other salary schedules, those for wage board "leaders" (the "WL schedule") and wage board "supervisors" (the "WS schedule") are directly linked to the WG schedule. The WS schedule is also linked to the general schedule grade GS-14.

SOURCE: Reference 14, Subchapter S5, "Prevailing Rate Determination".

Employment Cost Index

The Bureau of Labor Statistics is currently developing a new series on total compensation.[1] It is not yet available but the first figures are expected in early 1976. It will differ from other available earnings data in two important respects. First, its coverage in terms of industries will be far more comprehensive than any single index or survey currently available. Second, it will include fringe benefits as well as straight-time earnings.

Initially, BLS will prepare an overall nationwide index for private non-farm workers. Eventually, however, subindexes will be available for nine major industry classifications, 12 occupational groups, and the nine major census regions in the U.S.

Using this index for the purpose of adjusting military pay would represent a change in the current comparability methodology. The current process relies on comparisons of pay between military (or General Schedule) personnel and private enterprise workers holding similar jobs. The employment cost index will not provide data in the detail now used. Consequently, further discussion of the employment cost index is included in a later section of this paper where changes to the basic comparability methodology are considered.

Summary

If the basic comparability methodology is retained, there is a requirement for better, more representative, data on civilian private enterprise salaries. Of the data sources currently available, only two provide data suitable for use in adjusting military pay, the PATC survey and the AWS. The next section of this paper considers their use for this purpose.

USING THE PATC AND AREA WAGE SURVEYS

The preceding discussion suggests that a direct link between military pay and civilian private enterprise pay, using currently available data, will have to rely on data from the PATC and area wage surveys. This section considers what effect such use might have on military pay. It first examines the representativeness of the two surveys together, and then the effect their use would have had on military pay for recent years.

Representativeness

As noted earlier, the PATC survey is not particularly representative of the military work force. How is this situation improved by including the AWS? Tables 13 and 14 provide a partial answer. While the PATC jobs alone represented only 9.9 percent of

[1] See reference 16 for a description of this new series and its scope and methodology.

TABLE 13

REPRESENTATIVENESS OF PATC AND AWS OCCUPATIONS, ENLISTED FORCE

PATC Occupations	AWS Occupations	DOD Enlisted Occupation Group	Percent of Enlisted Force
	Electronics Technician	Electronic Equipment Repairmen (1)	11.3%
Drafters	Draftsmen	Drafting(413)	0.1
		Illustrating(414)	0.1
Chemist Engineer		Scientific & Engineering Aides(44)	0.1
Job Analyst		Personnel,General(500)	2.4
File Clerk Messenger Secretary Stenographer Typist	File Clerk Messenger Secretary Stenographer Typist	Administration (51)	5.6
Computer Operator Keypunch Operator	Tabulating-Machine Operator	Data Processing - Operators/Analysts(531)	0.8
	Programmer,Business System Analyst,Business	Data Processing - Programmers(532)	0.2
Accountant Accounting Clerk Auditor	Bookkeeping-machine Operator Payroll Clerk	Accounting,Finance, Disbursing(54)	0.8
	Shipping & Receiving Clerk	Supply Administration (551)	2.9
	Engineer,Stationary Fireman,Stationary Boiler Mechanic,Automotive Mechanic,Maintenance	Electrical/Mechanical Equipment Repairman(6)	22.9
	Carpenter Electrician Engineer,Stationary Helper,Maintenance Trades Machine Tool Operator Machinist Painter Pipefitter Sheet-Metal Worker	Craftsmen(7)	4.9
	Janitor,Porter,Cleaner	Stewards/Enlisted Aides (801) Auxiliary Labor(85)	0.3
	Truckdriver	Motor Vehicle Operators(811)	2.1
	Laborer Order Filler Packer,Shipping Trucker	Warehouse and Equipment Handling (822)	0.8
	Guard/Watchman	Military Police,General (830)	3.2
TOTAL			58.5

SOURCE: PATC occupations from reference 5. AWS occupations from reference 12. DoD Occupation Groups from reference 8. Figures were taken from the individual service master personnel records as of 30 June 1974.

TABLE 14

REPRESENTATIVENESS OF PATC AND AWS OCCUPATIONS, OFFICER FORCE

PATC Occupations	AWS Occupations	DoD Officer Occupation Group	Percent of Total Force
Engineer		Engineering & Maintenance Officers (4)	15.0%
Chemist Engineer		Physical & Mathematical Scientists (5A)	0.8
Attorney		Lawyers (5F)	1.5
	Nurse	General Nurses (6E)	0.1
Director of Personnel		Manpower & Personnel (7C)	2.2
Accountant Auditor Chief Accountant		Comptrollers & Fiscal (7D)	1.3
Computer Operator	Programmer, Business Systems Analyst, Business	Data Processing & Statistics, 0-1 & 0-2 only (7E)	0.4
Buyer		Procurement & Production	0.9
TOTAL			22.2

SOURCE: PATC occupations from reference 5. AWS occupations from reference 12. Figures were taken from the individual service master personnel records as of 30 June 1974.

the enlisted force, adding the AWS jobs increases this to 58.5 percent. For officers, the increase was only 0.1 percentage points, from 22.1 percent to 22.2 percent. These figures overstate the representativeness of the two surveys, however. Only one job (electronics technician) represents 11.3 percent of the enlisted force, and another single job (engineer) represents 15 percent of the officer force. Although four AWS jobs match enlisted group 6 military occupations, one of them (maintenance mechanic) represents over 80 percent of group 6 personnel, or 18.8 percent of the total force. Thus, only two AWS jobs, maintenance mechanic and electronics technician, represent 30.1 percent of the total enlisted force.

Tables 15 and 16 illustrate this deficiency more dramatically. They show that large fractions of the enlisted force and virtually all of the officer force are either not represented in the two surveys or severely under-represented. In other words, the PATC and area wage surveys together do not closely approach a representative sample of military occupations.

This argument is even stronger when pay grade is considered.[1] The figures in tables 13 through 16 are independent of pay grade. Yet, most of the jobs in the AWS and the PATC survey correspond to the lower pay grades: E-1 through E-5 for enlisted personnel and O-1 through O-3 for officers. These lower pay grades represent 79.6 percent of the enlisted force and only 59.4 percent of the officer force.

The figures in tables 15 and 16 suggest that this under-representation need not happen. Only two enlisted occupation groups, 0 and 2, do not have any obvious civilian counterparts and they represented less than 30 percent of the total force in FY 1974. Moreover, of those in group 0, nearly half were either E-1s through E-3s with no occupation code (group 00), or seamanship specialists (group 06) who do have civilian counterparts (merchant marine sailors). Of those in group 2, over one-third were radio and sonar operators, most of whom also have civilian counterparts. In short, it should be possible to construct a survey of civilian occupations which represents over 70 percent of the enlisted force.

In the case of officers, only groups 2 and 3 have no clear civilian counterparts. These two groups included 48.9 percent of the officer force in FY 1974. Of those in group 2, over 40 percent are pilots and other aircraft crew members. Civilian counterparts exist for at least some of these jobs. In principle, then, civilian jobs representative of over 50 percent of the officer force also could be surveyed.

While the AWS usefully supplements the PATC survey, the two surveys together still fall short of a fully representative job sample. Further, this does not seem to be a result

[1] When pay grade is considered, the PATC and area wage surveys represent only 32.1 percent of the enlisted force. See table A-3 in appendix A.

TABLE 15

OCCUPATIONAL DISTRIBUTION OF ENLISTED FORCE,
FY 1971 and FY 1974

DoD Occupation Group	Percent of Total Force		Number of PATC Job Matches	Number of AWS Job Matches
	FY 71	FY 74		
0. Infantry, Gun Crews, and Seamanship Specialists	23.7%	20.6%	0	0
1. Electronic Equipment Repairmen	9.2	11.3	0	1
2. Communications and Intelligence Specialists	7.8	7.2	0	0
3. Medical and Dental Specialists	4.0	4.3	0	0
4. Other Technical and Allied Specialists	2.1	2.0	3	1
5. Administrative Specialists and Clerks	17.3	16.6	11	14
6. Electrical/Mechanical Equipment Repairmen	20.9	22.9	0	4
7. Craftsmen	4.7	4.9	0	9
8. Service and Supply Handlers	10.2	10.3	0	7
TOTAL	100.0	100.0	14	36

SOURCE: See table 13.

of the composition of the military work force. Civilian jobs could be surveyed to represent at least 70 percent of the enlisted force and about 50 percent of the officer force.

Effect on Military Pay

Although the PATC and area wage surveys together do not make a very representative job sample, it is still interesting to ask what effect their use might have had on military pay over the past few years. This effect, of course, depends on the way the PATC and AWS data is used. For the illustrative purposes here, wage indexes have been constructed for the period 1967 through 1973 using the PATC and AWS data for those

TABLE 16

OCCUPATIONAL DISTRIBUTION OF OFFICER FORCE,
FY 1971 and FY 1974

DoD Occupation Group	Percent of Total Force		Number of PATC Job Matches	Number of AWS Job Matches
	FY 71	FY 74		
1. General Officers and Executives, n.e.c.	1.6%	2.0%	0	0
2. Tactical Operations Officers	47.1	45.1	0	0
3. Intelligence Officers	4.3	3.8	0	0
4. Engineering and Maintenance Officers	15.0	15.0	1	0
5. Scientists and Professionals	5.1	5.8	2	0
6. Medical Officers	8.0	9.1	0	1
7. Administrators	12.7	13.1	5	2
8. Supply Procurement and Allied Officers	6.2	6.1	1	0
TOTAL	100.0	100.0	9	3

SOURCE: See table 14.

years. These indexes are then compared to the actual comparability adjustments for Civil Service pay for the same years.

The indexes are based on weighted averages of the PATC and AWS occupation salaries. The weights are derived from the occupational distribution of the military force in FY 1974. Five indexes have been computed: enlisted force, E-1 to E-3; enlisted force, E-4 and E-5; total enlisted force; total officer force; and total force, enlisted and officer. A PATC or AWS occupation was included in the computation of the averages if it corresponded to a military occupation, and salary data was available for all seven years, 1967 to 1973.[1]

The total enlisted and total officer indexes were combined to produce the total force index using total officer and total enlisted strength as weights. The other indexes were constructed using the military populations in the appropriate job categories as weights.[2]

The calculated indexes are presented in table 17. Before examining them in detail, several qualifications should be noted. Above all else, these indexes should not be thought of as representing the "ideal" or "reasonable" pay increases for military personnel over the past few years. As noted earlier, the PATC and AWS occupations are not a representative job sample in any respect. Large parts of both the officer and enlisted occupational distribution are not represented at all. The job definitions in the two surveys may not be appropriate for the military case either.

Despite these drawbacks, the indexes in table 17 are interesting for several reasons. First, note that the addition of the AWS occupations to the PATC results has a significant effect on the indexes. Relative to 1967, the total force index is 3 percent higher in 1973 when the AWS jobs are included. The total enlisted index is 4 percent higher in 1973 when the AWS jobs are included. This phenomenon results from the fact that the earnings of workers in the skilled maintenance trades (electricians, carpenters, etc.) and in the semi-skilled and unskilled plant jobs (janitor, supply handlers, etc.) have risen faster than earnings for office and clerical workers. (This trend has continued through 1974. See table 18.) These maintenance and plant jobs are those for which the AWS data supplements the PATC data. These jobs also represent a significant fraction of military personnel (see table 15, above).

It is also interesting to examine the differences among the indexes for different subsets of the military population. When just PATC data is used, the five indexes move very

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[1] It is, in principle, easy to allow for different numbers of occupations in different years. The possible increase in accuracy, however, was judged not worth the computational cost of doing so.

[2] Occupations included and other computational details are presented in appendix A.

TABLE 17

WAGE INDEXES FOR MILITARY POPULATION BASED ON PATC AND AWS DATA, 1967-1973

(1967 = 100.0)

Year	E1-E3	E4-E5	Total Enlisted	Total Officer	Total Force
PATC Only:					
1967	100.0	100.0	100.0	100.0	100.0
1968	104.9	104.6	105.1	105.2	105.1
1969	110.6	110.3	110.8	112.8	111.3
1970	117.7	117.2	117.7	119.5	118.1
1971	125.4	125.0	125.5	126.6	125.8
1972	131.3	131.1	131.4	131.6	131.5
1973	138.2	137.4	137.7	138.7	138.0
Number of Jobs	13	8	31	32	63
PATC and AWS:					
1967	100.0	100.0	100.0	100.0	100.0
1968	104.6	105.5	105.3	105.2	105.3
1969	110.5	112.0	111.6	112.8	111.9
1970	117.5	118.4	118.2	119.5	118.5
1971	125.5	127.2	126.6	126.6	126.6
1972	133.9	136.7	135.7	131.6	134.7
1973	141.7	144.5	143.2	138.7	142.1
Number of Jobs	19	24	53	32	85

Source: see text.

closely together. When AWS data is included, however, this is no longer true. In 1973, the index for the E-4 – E-5 group is 2 percent higher than the E-1 – E-3 index, relative to 1967. The enlisted index is over 3 percent higher than the officer index, when AWS data is included.

The data in table 17, then, suggests that the choice of job surveys could have a significant effect on any change in military pay based on such surveys. It also suggests

TABLE 18

AREA WAGE SURVEY EARNINGS INDEXES

1967 = 100.0

Year	Occupational Group		
	Office Clerical	Skilled Maintenance	Unskilled Plant
1967	100.0	100.0	100.0
1968	104.9	105.5	105.4
1969	111.0	112.4	111.8
1970	118.1	119.0	118.6
1971	125.5	127.9	128.1
1972	132.9	137.9	138.5
1973	139.5	146.6	147.2
1974	148.1	157.9	157.7

Source: Reference 12, table A-28, p. 85, for 1967-73. Data for 1974 provided by Bureau of Labor Statistics.

that a pay raise which represents comparability for one segment of the military force may not represent comparability for another. This is not surprising, however. The comparability calculation for General Schedule employees is quite sensitive to the exclusion or inclusion of one job, let alone a whole sample. Also, since wages do not change at the same rate for all occupations in the private sector, a uniform increase in pay for all employees will generally result in overpaying some and underpaying others.

It is also interesting to compare the indexes in table 17 to the changes in military pay over a similar period. Military pay raises since 1967, however, have been composed of several elements. There have been annual comparability adjustments, but there have also been raises to achieve equity or comparability for first-termers (the "AVF pay raise" in 1971), and 1967 was not a year in which military pay was considered "comparable." Thus the pay raises since 1967 have been in excess of what would have occurred had comparability been a fact in 1967 and simply maintained since then. Consequently, table 19

compares the indexes of table 17 to General Schedule pay raises since 1967, when the principle of comparability was first implemented. In other words, the calculated indexes are compared to what would have happened to military pay had the current adjustment process been in use since 1967. Table 19 also contains a comparison of the General Schedule increases to the indexes from table 17 for the period 1970 to 1973, because 1970 was the

TABLE 19

COMPARISON OF GENERAL SCHEDULE WAGE INDEX TO MILITARY WAGE INDEXES BASED ON PATC AND AWS DATA, 1967 - 1973

Year	General Schedule[1]	Total Military Force	
		PATC Only	PATC and AWS
	1967 = 100.0		
1967	100.0	100.0	100.0
1968	104.9	105.1	105.3
1969	114.4	111.3	111.9
1970	121.3	118.1	118.5
1971	128.6	125.8	126.6
1972	135.7	131.5	134.7
1973	142.6	138.0	142.1
	1970 = 100.0		
1970	100.0	100.0	100.0
1971	106.0	106.5	106.9
1972	111.8	111.3	113.7
1973	117.5	116.8	120.0

[1]Index as of 31 December.

Source: General schedule index from reference 17, p. 16. Military indexes from table 17.

year in which "full comparability" was achieved for the General Schedule and the current adjustment process was adopted.

As table 19 shows, adjusting military pay according to the indexes in table 17 would have resulted in essentially the same pay raise between 1967 and 1973 as would an adjustment based on the General Schedule pay increases. However, between 1970 and 1973, using information from the PATC and area wage surveys would have resulted in somewhat higher pay increases than would have resulted from use of the calculated General Schedule increases.

In a recent paper, Robert Shishko asked essentially the same question addressed in this section: Is there reason to believe the current comparability process does not reflect "comparable" pay for military personnel? From AWS regional wage indexes, Shishko constructed overall wage indexes, using as weights the regional distribution of FY 1974 military accessions. He found that the AWS indexes increased faster than an (unweighted) index of PATC salaries for the 1967-73 period.[1]

Although Shishko's methodology is questionable[2] (as is the methodology behind the figures in table 17), both his results and those in table 17 confirm a conclusion drawn earlier: The current comparability process need not result in comparable military pay. Both the composition of the PATC survey and the comparability calculation itself ensure this. While the AWS data supplements the PATC results, the two surveys together still do not make up a representative sample. The next section describes the composition of a more representative or "ideal" job sample, while the following section addresses the use to which data from such a sample might be put.

AN "IDEAL" JOB SAMPLE

Appendix B describes ideal job samples on which to base a direct comparability link between military and civilian pay. They are summarized below. Although the recommendations in appendix B are fairly specific with respect to occupational areas, specific job titles are not mentioned. There is good reason for this. An appropriate job sample would take at least several months to design and require the work of the experts in military and civilian job description. For example, the PATC and area wage surveys were each the result of several years' work in developing job descriptions and experimental surveying.

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[1] See reference 18, particularly pp. 6-14.

[2] Despite his careful derivation, Shishko's rationale for using regional weights still seems doubtful. The use of regional weights implicitly assumes that the regional distribution of military accessions in the base period (FY 1974) is in some sense ideal or desirable. Further, and perhaps more important, it is not obvious what relevance, if any, regional weights based on accessions have for the career force. Also, Shishko apparently used no occupation weights.

Since their initial implementation, these surveys have been subject to constant review and revision. Further, inclusion of a specific job in a survey will depend not only on the degree to which it represents military occupations, but also on the ease with which it can be surveyed. Thus, experience and practical survey considerations will modify any initial survey design.

The material in appendix B can, however, serve several purposes. First, it should be useful as a starting point for the design of an actual survey. Second, it demonstrates the basic feasibility of designing a survey which is more representative of military occupations than are the PATC and area wage surveys. Third, it can serve as the basis for estimating the cost of designing and implementing such a survey.

Appendix B actually describes two new surveys. The first, termed a "supplementary survey," could be used in conjunction with the results of the PATC and area wage surveys. As a result, it is smaller in size than a second survey, termed a "new survey," that could be used by itself for comparability calculations.

In designing these job samples, two conflicting criteria were considered. The first, of course, is that the samples be as representative and complete as possible. The second is that the samples not be greatly larger than the PATC and AWS samples. The result is samples which represent well all occupational areas that have clear civilian counterparts. (The second criterion has not been satisfied as well as the first, however.) In addition, almost all subgroups (two-digit DoD occupation codes) which account for more than one percent of either the total officer force or the total enlisted force have at least one survey job representing them. In determining from which occupation groups to draw survey jobs, the two criteria mentioned above were considered as well as subjective judgments as to the homogeneity of the various occupation groups. Should these judgments be incorrect (as some of them surely must be), an actual survey would have to be modified accordingly.

Summary of Job Samples

Tables 20 and 21 summarize the job samples described in appendix B and compare them to the coverage of the PATC and area wage surveys. The supplementary survey has between 25 and 33 jobs, while the new survey consists of between 51 and 62 jobs. The supplementary survey is thus slightly larger than the PATC survey in terms of number of occupations, while the new survey is between two and three times as large as the PATC. The enlisted occupations should be surveyed, when possible, for at least three or four work levels (representing E-1 – E-3, E-4 – E-5, E-6 – E-7, and possibly E-8 – E-9) while the officer occupations should be surveyed for at least three work levels (representing O-1 – O-2, O-3 or O-4, and O-5 or O-6).[1] In terms of total work levels, then, the supplementary survey would be, at most, 50 percent larger than the PATC survey, while a new survey would be between two and three times as large. These comparisons are summarized in table 22, along with similar figures for the area wage survey.

[1] The justification for this statement is developed below.

The sizes of the two surveys should be considered upper limits. In practice they could be considerably smaller. Some occupations will not be surveyable and others will not be amenable to survey at as many work levels as recommended. Also, the process of survey design may eliminate some jobs as redundant. Thus, for example, it is likely that fewer jobs need be surveyed in enlisted groups 5 and 6 than recommended.

As tables 20 and 21 show, the new survey, or the supplementary plus the PATC and area wage surveys, is far more representative than the PATC and AWS alone. All enlisted occupation groups (with the possible exception of group 0) would be represented by at least two survey jobs if either the supplementary or new samples were adopted.

TABLE 20

COMPARISON OF IDEAL OFFICER JOB SAMPLE TO PATC AND AREA WAGE SURVEY REPRESENTATION

DOD Occupation Group	Percent of Total Officer Force, FY 1974	Number of PATC Jobs	Number of AWS Jobs	"Ideal" Sample	
				Supplementary	New
1. General Officers and Executives, N.E.C.	2.0%	0	0	0	0
2. Tactical Operations Officers	45.1	0	0	0	0
3. Intelligence Officers	3.8	0	0	0	0
4. Engineering and Maintenance Officers	15.0	1	0	2-5	2-5
5. Scientists and Professionals	5.8	2	0	1	3
6. Medical Officers	9.1	0	1	0	0
7. Administrators	13.1	5	2	2-3	5-6
8. Supply Procurement and Allied Officers	6.1	1	0	2	3
Total	100.0	9	3	7-11	13-17

TABLE 21

COMPARISON OF IDEAL ENLISTED JOB SAMPLE TO PATC AND AREA WAGE SURVEY REPRESENTATION

DOD Occupation Group	Percent of Total Enlisted Force FY 1974	Number of PATC Jobs	Number of AWS Jobs	"Ideal" Sample Supplementary	"Ideal" Sample New
0. Infantry, Gun Crews and Seamanship Specialists	20.6%	0	0	4	4
1. Electronic Equipment Repairmen	11.3	0	1	3-4	4-5
2. Communications and Intelligence Specialists	7.2	0	0	2	2
3. Medical and Dental Specialists	4.3	0	0	2	2
4. Other Technical and Allied Specialists	2.0	3	1	0	1
5. Administrative Specialists and Clerks	16.6	11	14	0	8-10
6. Electrical/Mechanical Equipment Repairmen	22.9	0	4	4-7	8-11
7. Craftsmen	4.9	0	9	0	2-3
8. Service and Supply Handlers	10.3	0	7	3	7
Total	100.0	14	36	18-22	38-45

TABLE 22

COMPARISON OF SURVEYS IN NUMBER OF OCCUPATIONS AND WORK LEVELS

Survey	Number of Occupations	Number of Work Levels
PATC	20	84
Area Wage Surveys	44	66
"Ideal" Supplementary	25-33	93-121
"Ideal" New	51-62	191-231

Source: Tables 1, 11, 20, and 21.

Although officers are not represented as well, adopting either sample would significantly improve representativeness as compared to the PATC and area wage surveys.

The Cost of an "Ideal" Job Survey[1]

A possible objection to surveying these ideal job samples is that doing so would be prohibitively expensive. This does not appear to be a reasonable objection. It is impossible to estimate precisely the costs of such surveys. That will depend on, among other things, the number of firms that must be visited, the number of jobs that can be sampled at each firm, and the costs of processing and collating the data. But reasonably good estimates can be made on the basis of the costs of administering the current surveys.

The PATC survey, for example, currently costs the Bureau of Labor Statistics slightly less than $2 million per year. This includes the costs of collecting the data, as well as processing costs, and the cost of preparing the final annual report. These costs will vary less than proportionately with the number of work levels or occupations surveyed, since many work levels can be surveyed at each firm. The principal determinant of collection costs is the firm visit, not the number of work levels surveyed at each firm. Thus, if roughly the same number of firms were visited as for the PATC survey, the supplementary survey should cost no more than $3 million (one and one-half times the cost of the PATC) while the new survey should cost no more than $5 million (two and one-half times the cost of the PATC).

[1]The discussion in this section relies heavily on conversations with employees of BLS responsible for administering the PATC and area wage surveys.

In the next section, and earlier, it is argued that the industrial and establishment-size coverage of the PATC survey is very limited and should be expanded. Doing so would mean surveying perhaps as many as twice as many firms as are currently included in the PATC survey. (See table 7 and the related discussion above.) Survey costs are nearly proportional to the number of firms, so surveys with approximately twice the coverage of the PATC should cost roughly twice the amounts in the preceding paragraph.

To summarize, a new survey, with expanded industrial and establishment-size coverage, should cost somewhat less than $10 million. A supplementary survey, again with expanded coverage, should cost about $5 million. These are the costs that would be incurred each time the survey is administered (probably annually). There would also be costs of precisely defining the job sample and designing the survey. Based on BLS experience with other surveys, this process should take two to three years. During this time, annual costs should be substantially less than the cost of administering the survey. However, the final step in the process may include a test survey of full size and scope that would cost roughly the same as the final survey. Nevertheless, implementation costs, spread over a three-year period for example, should be far less than either $30 million for a new survey or $15 million for a supplementary survey.

One cost not yet considered is the burden imposed on respondent firms in the survey. Surveys like the PATC or AWS depend on the voluntary cooperation of firms. Asking them to participate in yet another survey may result in considerable opposition. Officials at BLS are, of course, particularly sensitive to this possible response and have raised some doubts about the possibility of successfully administering either of the additional surveys presented here. Should their doubts be confirmed, alternatives to this survey approach will have to be considered. Several possibilities are discussed below.

USING AN "IDEAL" JOB SURVEY

The previous section has outlined the composition of "ideal" job samples. The data which results from a survey of such samples could be used to make periodic (presumably annual) comparability adjustments to military pay. This section discusses how the data could be used for this purpose, and what kind of data should be collected.

Previous sections of this paper have, by implication, addressed the issue of what kind of data should be collected, in the context of discussing drawbacks to the current comparability process. Therefore, these arguments will merely be summarized here.

One principal defect of the current comparability process is that the annual pay raise is based on civilian salaries for occupations that represent only a small fraction of the military labor force. The previous section has presented a job survey that is very representative of military occupations. A survey, however, should be representative not only of occupations, but also of work levels. For this reason, for each occupation included in a survey, data should be collected at several work levels. The exact

number for any specific occupation will depend on how many work levels can be surveyed in the civilian sector, and the organization of the military occupation. The latter consideration, however, suggests that, when possible, three or four work levels should be surveyed for each job.

For enlisted personnel, pay grades E-1 through E-3 are composed of either unskilled labor or apprentices, while pay grades E-4 and E-5 are viewed as journeymen. Working supervisors are found in pay grades E-6 and E-7, while senior supervisors are drawn from pay grades E-8 and E-9. This classification scheme (which will probably differ for some occupations) suggests that, ideally, at least three work levels ought to be surveyed for each enlisted occupation. Since E-8s and E-9s represent such a small fraction of the total enlisted force (less than 3 percent, see table 23), it may not be necessary, desirable, or even possible to survey all occupations at this work level. This should be a matter for further investigation if an actual survey is designed.

In the case of officers, O-1s and O-2s are generally considered entry-level positions, with, compared to more senior officers, relatively little responsibility for personnel or equipment. The O-3s and O-4s are junior managerial levels, while the O-5s and O-6s represent more senior managerial positions. The general and flag officers (O-7 through O-10) are analagous to senior executives in the civilian sector. The PATC survey does not now include any jobs equivalent to GS-16, 17 or 18 on the grounds that generally accepted job definitions have been impossible to develop. If this argument is correct, it implies that surveying jobs equivalent to the general and flag officer grades will also be quite difficult, if not impossible. Thus officer occupations should be surveyed for at least three work levels: one representing O-1s and O-2s, a second representing O-3s and O-4s, and a third representing O-5s and O-6s.

Another criticism of the current comparability process is that civilian salaries are surveyed for only a limited part of the economy. This is a defect that is easily remedied, and one that should be remedied, for any new survey. The military services compete for personnel on a national basis and their competition consists not only of moderate to large size firms in manufacturing and other selected industries, but also of smaller firms in these industries plus firms in other industries and state and local governments. Starting with the current coverage of the PATC survey, the coverage of a new survey should be expanded to include smaller firms in industries now covered by the PATC, as well as employers in industries (including state and local governments) currently excluded. This would probably involve roughly doubling the sample size of the PATC survey. Complete coverage may not be possible because, for example, very small firms may not be surveyable because of a lack of consistent job definitions. Nevertheless, coverage should be as extensive as possible.

Given the job sample and the firms to be surveyed, what data should be collected? One of the criticisms of the PATC survey and the current comparability process is that the salary information collected and used does not reflect fringe benefits. Thus an

TABLE 23

MILITARY WORK FORCE BY PAY GRADE, FY 1974

Pay Grade	Number	Percent of force
Enlisted		
E1-E3	679,256	36.2%
E4, E5	814,108	43.4
E6, E7	328,149	17.5
E8, E9	53,052	2.8
Total	1,874,565	100.0
Officer		
O1, O2	66,656	23.4%
O3	102,812	36.0
O4	59,727	20.9
O5	36,764	12.9
O6	18,021	6.3
O7-O10	1,408	0.5
Total	285,388	100.0

Source: Service master personnel records as of 30 June 1974.

"ideal" survey should reflect total compensation rather than just basic pay. In practice, this may prove difficult to do, but every effort should be made to satisfy this criterion. Among the problems which will have to be addressed are the treatment of unvested retirement rights, and the attribution of non-pay-related benefits such as insurance costs and leave (annual, holiday, and sick) benefits.

The concept of total compensation also requires some consideration of the length of the workweek (and the effects of overtime) and expected unemployment. Currently, for example, the PATC data is based on the assumption of a standard 40-hour workweek when hourly wage data is collected. But if the standard workweek includes overtime (as is often

the case for some occupations), the PATC data will underestimate total pay. For many occupations, periods of partial or total unemployment are the rule. The PATC data then reflects the pay of full-time continuously employed workers, and therefore overestimates the pay of the "average" worker in occupations where some unemployment can usually be expected. An ideal survey would have some means for coping with these problems too.

Of course, if military pay is to be directly compared to civilian pay,[1] many of these issues will have to be addressed when computing military pay. That is, total military compensation should also include a measure of retirement benefits and other fringe benefits such as health care, insurance, and exchange and commissary privileges.

Given the collection of this ideal compensation data, the next issue is the use of that data. There are basically two ways such data could be used. The first is to follow the procedures currently used for adjusting General Schedule pay: construct "paylines" for military and civilian pay and adjust military pay to equalize the two paylines. The second would be to construct an index of civilian pay (similar to those of table 17) and adjust military pay according to changes in that index.

This second approach seems to be more appealing, but it requires the assumption that the initial level of military pay is "comparable." If it is not, making adjustments in this way will preserve the initial (percent) differential between military and civilian pay. This may imply perpetual over or underpayment of military personnel. The indexing method, however, has the advantage of not requiring comparable estimates of military and civilian total compensation. The indexing method also seems better suited to adjusting the intergrade differentials according to civilian salary data. Individual indexes could be computed for each pay grade or pay grade group. A payline approach would generally impose some prior constraint on the pattern of the intergrade differentials. If, however, a payline approach is used, the defects of the current technique -- particularly the lack of a weighting scheme -- can and should be corrected.

[1] Here, and elsewhere, "civilian," as in "civilian pay" or "civilian employment," refers to the non-Federal sector of the economy or the labor force.

CONCLUSION

The discussion in the preceding section has outlined procedures for making the comparability process, for military pay, more realistic. However, a number of problems which may make implementing these procedures difficult have been glossed over. This section addresses the more obvious of these and possible solutions to them. They are organized into two major groups: practical problems and conceptual problems. A "practical problem" is a problem that may be encountered in administering a survey or using its results. A "conceptual problem" is one that may not be solved even if an ideal survey is successfully administered and its results used in the most appropriate way.

PRACTICAL PROBLEMS

The principal practical problem that may be encountered is that surveys of the size and scope described above cannot be administered. This could arise because the surveys are too expensive, or because civilian employers would not cooperate in such large surveys. The latter possibility is probably more likely than the former. If the cost estimates here are accurate, a new survey could be administered for $10 million or less. This seems a small price to pay for ensuring a more reasonable determination of pay for which a one percent change involves over $200 million.

If employer recalcitrance (or survey costs) should prohibit administering an ideal survey, there are two alternatives: administering smaller surveys or using currently collected data. It should be emphasized again that the size of the surveys described above should be considered upper limits. The process of designing an actual survey may considerably reduce the number of occupations and work levels shown in table 22. This is likely to happen as some jobs are found unsurveyable and others are eliminated as redundant.[1] Thus an actual survey design may eliminate or significantly reduce the obstacles arising from an overly large job sample. Indeed, if the size of the survey is judged to be a significant problem, the survey could be designed to take account of this problem.

Using currently collected data is surely less desirable than administering a new survey. But using currently collected data in an appropriate fashion would still represent an improvement over current procedures. At this time, only the PATC and area wage surveys are suitable for use. However, other data, at least in principle, could be used to supplement the PATC and AWS. Obvious candidates are the results of the various wage board surveys and the industry wage surveys. (See the discussion of these surveys, above.)

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[1] For example, it was recommended that as many as eight or ten jobs should be surveyed to represent enlisted occupation group "5. Administrative Specialists and Clerks." But the group may be homogeneous enough to be adequately represented by as few as two or three jobs.

Many objections to the current comparability process might remain unaswered, however, if currently collected data were used as the basis for adjusting military pay. In particular, industry and establishment-size coverage would be limited, and total compensation would not be measured. Also. job representation would probably remain less than ideal. Only a new survey would lessen or eliminate these objections.

Using a supplementary survey together with the PATC and area wage surveys is also subject to these same criticisms, of course. The PATC and AWS do not have ideal coverage, nor do they measure total compensation. Thus, even if the supplementary survey did not have these defects, much of the data used for adjusting military pay still would. This suggests that a new survey, if feasible, is clearly preferable to a supplementary survey used with the PATC and AWS. The supplementary survey has the advantage, however, of being smaller than a new survey (and hence lessens the likelihood of employer objections) and less expensive.

If the current comparability philosophy - comparing pay for similar military and civilian occupations - is abandoned, there is a third alternative to administering a new survey. Military pay could be adjusted annually on the basis of some currently estimated index, with periodic reviews of overall comparability to ensure that no serious under or overpayment occurs. The periodic review could be part of future QRMCs, while an attractive index for the interim adjustment would be the BLS's new *employment cost index.*

The employment cost index,[1] which will be published for the first time in 1976, is designed to show changes in the cost of labor in much the same way that the consumer price index reflects changes in the cost of a fixed group of consumer products. It will initially include only straight-time wages, but within a year will be expanded to include supplementary benefits as well. Its coverage will eventually be the entire economy. It will thus be a significant improvement over any currently collected wage series.

The employment cost index (ECI) will still have some shortcomings for the purpose of adjusting military pay, however. First, it is designed to reflect labor costs for the entire economy. If the occupational distribution of the military work force differs significantly from the rest of the country's, then the ECI's applicability to the military will be biased. Second, it will be an index of the cost of an hour of labor, and thus may not be easily adjusted for different work week lengths or expected unemployment. Third, it will be based on a sample of only 23 occupations. This small sample was dictated by data restrictions, but it leaves the representativeness of the survey open to question. Finally, when it includes fringe benefits it will measure the <u>costs</u> of these benefits

[1] See the earlier discussion and reference 15.

rather than their value to recipients. In general, there is no reason to expect these two measures to always move together, and only the latter (value to recipients) is appropriate for the purposes here.

Despite all these possible obstacles, some alternative to the current comparability process will probably have to be adopted for the military services. The President's Panel on Federal Compensation has recommended some major changes to the comparability process. Some of these will improve the process as it relates to the military (such as measuring total compensation rather than basic pay), but at least one will further weaken the case for linking military pay to General Schedule pay. The Panel has recommended that the General Schedule be split into two separate schedules. One would include clerical and technical jobs now part of the General Schedule, while a second would include the professional and administrative jobs. The clerical/technical schedule would vary by geographical location (as wage board salaries do today), and the professional/administrative schedule would be based on a national survey of private enterprise salaries (as does the General Schedule today).[1] If adopted, this would mean that the only national salary survey used to determine Federal pay would be even less representative of the military than is the PATC survey. Thus some change in the current comparability process for military pay is almost inevitable.

CONCEPTUAL PROBLEMS[2]

To begin, consider the function of a compensation system. Its first and only function is to attract and retain individuals of the quality and quantity the organization requires. It should also preserve internal equity, in some sense, so as not to cause tensions within the organization. But this is just another way of saying it should be designed to ensure attraction and retention of appropriate personnel. If employees do not consider a compensation system equitable, they will not serve the organization long or well.

The legislative intent behind the comparability principle is well summarized in the following passage:

> Adoption of the principle of comparability will assure equity for the Federal employee with his equals throughout the national economy - enable the

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[1] See reference 19, Chapter III. Government employee groups and unions are expected to strongly oppose these recommendations.

[2] The arguments in this section have benefitted from the author's discussions with other CNA staff members. A particular debt is owed to Harry Gilman and also Arnold Moore and Samuel Kleinman. Many of the issues raised here will be treated in far greater detail in a forthcoming CNA study of comparability and its effects directed by Gilman.

> government to compete fairly with private firms for qualified personnel - and provide at last a logical and factual standard for setting Federal salaries.[1]

As argued earlier, however, the actual implementation of the comparability principle has not reconciled the conflicting aims implicit in this passage. "Equity for the Federal employee with his equals throughout the national economy" has been interpreted to mean equal pay, but this need not "enable the government to compete fairly with private firms." Equal pay does not imply equal compensation if other conditions of employment differ significantly between government and civilian work. This means government employees will be either under or overpaid, relative to their civilian counterparts, as other conditions of employment are worse or better in the Federal government compared to the civilian sector.

This argument, of course, has particular application to the military. Equal pay for military personnel, relative to their civilian counterparts, will not in general mean equal compensation, since the non-pecuniary returns to employment in the two sectors are so different. The military offers greater job security and often greater responsibility at an earlier age, among other things, in exchange for less freedom and often more arduous working conditions and longer hours. Equal pay may be either more or less than sufficient to attract and retain appropriate individuals, depending on how the advantages and disadvantages of military life balance.

Even if this problem were solved, there is another problem with the comparability principle as it is currently applied. Today, comparability is implemented in terms of averages across a wide range of occupations. Thus, while pay may be comparable for the average employee, it may also be not comparable for any single employee or group of employees. This is a problem with the current General Schedule. "Comparable" pay for a GS-5 secretary is less than comparable pay for a GS-5 entry-level professional. (See table 3.) The result has been to overpay secretaries and clerical personnel (who represent the majority of GS-5 personnel) and underpay entry-level professionals, relative to their respective counterparts in the private sector. (See tables 3 and 6.)

This problem is not as severe for the military as it is for the General Schedule. The military services have at their disposal a wide range of special pays and bonuses to attack these kinds of problems. But since negative bonuses are not paid, using special pays may result in only a partial solution.

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[1] From "Salary Increases for Federal Service Employees," House Document No. 344, 87th Congress, 2nd Session, quoted in reference 19.

Another problem is that comparability currently is achieved, at best, on a task basis. That is, government (or military) workers are paid wages comparable to individuals in the civilian sector performing similar tasks. Career decisions are made, however, not only on the basis of pay for comparable jobs, but also on the basis of expected earnings over the length of a career. If journeymen and master craftsmen, for example, are paid similar wages in the military and civilian sectors, the military may still appear to be a better (worse) career if career progression is faster (slower) in the military.

Of course, in principle, it is possible to correct these shortcomings of comparability. For example, separate salary schedules and surveys could be established for each occupation; and the comparability process could include consideration of employees' attitudes about the working conditions or relative attractiveness of government jobs. Thus, in a sense, distinctions between "conceptual" and "practical" problems of implementing a comparability system are artificial - all problems are "practical" ones.

In practice, though, the distinction is still important. As it is currently applied, comparability does not address any of these conceptual problems. Indeed, if it did it would not be a comparable pay system as that concept is currently understood. Rather, it would be a competitive pay system, where employees were paid according to the principles outlined in the first paragraph of this section.

Choosing a comparable pay system over a competitive one may not have merely negligible effects. As table 24 shows, pay for the same job differs widely across industries. If comparability results in paying exactly average wages to Federal employees (and military personnel), but Federal employment is most "like" public utilities employment, then Federal workers (and military personnel) would be seriously underpaid. On the other hand, if Federal employment is most "like" employment in the finance, insurance, and real estate industries, then Federal employees would be seriously overpaid. Of course, not all the differences shown in table 24 are the result of differences in employment conditions across industries.[1] But the important point for this discussion is that, whatever the causes of these differences, the current comparability system does not account for them or even recognize the possibility that they exist.

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[1] If "employment conditions" is interpreted broadly to include such things as the likelihood of unemployment, the degree of unionization, or the employers' cost-consciousness, then the bulk of these differences probably are due to differences in employment conditions. Other causes would include, among other things, different geographical location by industry, different promotion patterns, and different employee quality.

TABLE 24

RELATIVE SALARY LEVELS BY INDUSTRY DIVISION,
SELECTED OCCUPATIONS

(Average salary for each occupation in all industries = 100)

Occupation	Industry					
	Manufacturing	Public Utilities	Wholesale Trade	Retail Trade	Finance Insurance Real Estate	Selected Services
Accountants	101	102	96	95	96	100
Auditors	104	106	100	96	92	115
Buyers	100	106	99	103	104	96
Directors of Personnel	99	103	107	94	104	101
Computer Operators	102	111	102	97	94	97
Clerks, accounting	102	118	96	90	89	101
Clerks, file	107	131	101	96	94	109
Keypunch operators	102	121	98	94	91	104
Messengers	104	122	97	94	90	96
Secretaries	101	114	99	94	93	105
Stenographers	102	111	96	96	87	98
Typists	105	114	103	101	92	108

Source: 1974 PATC Survey; table adapted from table 8, reference 5, p. 30.

In short, comparability, as it is applied today and as it is likely to be applied in the future, will not generally imply a compensation system that efficiently ensures attraction and retention of personnel of the appropriate quality and quantity. The best that can be said for a comparability process similar to that used today is that it provides a rough estimate, or starting point, for determining an efficient compensation system.

Unfortunately, no obvious alternative or extension to comparability presents itself. Ideally, changes in the compensation system should be a function of queues or shortfalls in the hiring process - queues signalling wages that are too high, and shortfalls indicating wages that are too low. Queues or shortfalls, however, are a function of the services' quality restrictions as well as total military compensation. If quality requirements are set high enough, even very high levels of compensation will still generate shortfalls. If quality requirements are set low enough, queues are likely to appear. Thus, the appropriate level of military compensation depends on both the military's demand for personnel - in terms of both quantity and quality - and the civilian opportunities ("comparable" pay) of military personnel. This is an information requirement the services cannot meet today. Until such information is developed (and it will not be easy), something like the current comparability process, with all its faults, may be the only reasonable alternative. This is more true if careful, intelligent use is made of special pays and bonuses.

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APPENDIX A

WAGE INDEXES BASED ON PATC AND AREA WAGE SURVEYS

This appendix describes the construction of military wage indexes based on data from the PATC and area wage surveys. It also presents an estimate of the representativeness of the PATC and area wage surveys different than those presented in tables 8, 9, 13, and 14 of the text.

The starting point for construction of the indexes was determination of the correspondence between PATC and AWS jobs and military occupations. Table A-1 lists this correspondence. It was developed using job descriptions in references 5 and 13 for PATC and AWS occupations, military job titles listed in references 8 and 9, and military and civilian job descriptions in reference 20. For PATC jobs, paygrade correspondences were based on the relations shown in table A-2. For AWS jobs, the pay grade correspondences were based on job descriptions and information supplied by BLS employees.

In general, any PATC or AWS job which corresponds to a military occupation as shown in table B-1 was included in the construction of the indexes shown in table 17. If, however, salary data was not available for all seven years (1967 to 1973) an occupation was not included. This was strictly a computational convenience since it is possible to allow for different numbers of occupations in different years.

The indexes shown in table 17 were based on average salaries for the occupations included in each group. The average salaries were a weighted average of the salaries for all included occupations. The weights were simply the number of military personnel associated with each occupation. For example, the salary for "Job Analyst II" received a weight of 8,878, the number of military personnel in pay grades E-6 and E-7 in occupation subgroup "500. Personnel, General." If more than one PATC or AWS job was associated with the same military occupation, they were weighted equally, with the sum of their weights being the number of personnel in the military occupation. For example, "Accountant I" and "Auditor I" both correspond to military occupation group "541. Auditing and Accounting" at pay grades E-4 and E-5. In FY 1974 there were 2,900 military personnel in that occupation at pay grades E-4 and E-5. Thus the "Accountant I" and "Auditor I" salaries each carried a weight of half 2,900 or 1,450. The weights were derived from the occupational distribution of military personnel in FY 1974. This distribution is shown for 2-digit occupation codes in tables B-1 through B-18 in appendix B.

The correspondences in tables A-1 and A-2 and this weighting scheme are open to criticism on several grounds. The information in tables A-1 and A-2 is based on subjective judgements that will not always be as accurate as decisions based on better or more complete information.

TABLE A-1

CORRESPONDENCE BETWEEN MILITARY OCCUPATIONS AND PATC AND AWS OCCUPATIONS

PATC	AWS	Enlisted	Officer
Accountant	I	Auditing & Accounting (541)-E4, E5	
	II	541-E6, E7	
	III	541-E8, E9	Comptroller & Fiscal (7D)-01, 02
	IV		7D-03
	V		7D-04
Auditor	I	541-E4, E5	
	II	541-E6, E7	
	III	541-E8, E9	7D-01, 02
	IV		7D-03
Chief Accountant	I		7D-03
	II		7D-04
	III		7D-04
	IV		7D-05
	V		7D-06
Attorneys	I		Lawyers (5F)-01, 02
	II		5F-03
	III		5F-04
	IV		5F-04
	V		5F-05
	VI		5F-06
Buyer	I		
	II		
	III		Procurement & Production (8D)-01, 02
	IV		8D-03

TABLE A-1 (Cont'd)

PATC	AWS	Enlisted	Officer
Job Analyst	I	Personnel, General (500)-E4, E5	
	II	500-E6, E7	
	III	500-E8, E9	
	IV		
Director of Personnel	I		Manpower & Personnel (7C)-03
	II		7C-04
	III		7C-04
	IV		7C-05
Chemist	I	Scientific & Engineering Aides (44)-E4, E5	
	II	44-E6, E7	
	III	44-E8, E9	Physical & Mathematical Scientists (5A)-01, 02
	IV		5A-03
	V		5A-04
	VI		5A-04
	VII		5A-05
	VIII		5A-06
Engineer	I	44-E4, E5	
	II	44-E6, E7	
	III	44-E8, E9	Engineering & Maintenance Officers (4)-01, 02
	IV		4-03
	V		4-04
	VI		4-04
	VII		4-05
	VIII		4-06

TABLE A-1 (Cont'd)

PATC		AWS		Enlisted	Officer
Engineering Technician					
Drafter-Tracer		Drafter-Tracer		Drafting & Illustrating (413 & 414) E1-E3	
Draftsmen	I	Drafters	C	413 & 414 - E4, E5	
	II		B	413 & 414 - E6, E7	
	III		A	413 & 414 - E8, E9	
Computer Operator	I			Operators/Analysts (531)-E1-E3	
	II			531-E4, E5	
	III	Computer Operator	C	531-E4, E5	
	IV		B	531-E6, E7	
	V		A	531-E6, E7	
	VI			531-E8, E9	Data Processing & Statistics (7E)-01,02
Keypunch Supervisor					
Accounting Clerk	I	Accounting Clerk	B	Accounting, Finance & Disbursing (54)-E1-E3	
	II		A	54-E1-E3	
File Clerk	I	File Clerk	C	Administration (51)-E1-E3	
	II		B	51-E1-E3	
	III		A	51-E1-E3	
Keypunch Operator	I	Keypunch Operator	B	531-E1-E3	
	II		A	531-E1-E3	

TABLE A-1 (Cont'd)

PATC		AWS		Enlisted	Officer
Messenger		Messenger		51-E1-E3	
Secretary	I			51-E1-E3	
	II	Secretary	D	51-E4, E5	
	III		C	51-E4, E5	
	IV		B	51-E6, E7	
	V		A	51-E8, E9	
General Stenographer		General Stenographer		51-E1-E3	
Senior Stenographer		Senior Stenographer		51-E1-E3	
Typist	I	Typist	B	51-E1-E3	
	II		A	51-E1-E3	
		Biller, Machine			
		Bookkeeping Machine Operator	B	Disbursing (542) E1-E3	
			A	542-E4, E5	
		Order Clerk			
		Payroll Clerk		542-E4, E5	
		Switchboard Operator			
		Switchboard Operator/Typist			
		Tabulating Machine Operator		531-E4, E5	
		Transcribing Machine Operator			

TABLE A-1 (Cont'd)

PATC	AWS		Enlisted	Officer
	Computer Programmer, Business	C	Programmers (532)E1-E3	
		B	532-E4, E5	
		A	532-E6, E7	
	Computer Systems Analyst, Business	C	532-E4, E5	
		B	532-E6, E7	
		A	532- E8, E9	7E-O1, O2
	Electronics Technician		Electronic Equipment Repairman (1)-E4, E5	
	Nurse			General Nurses (6E)-O1, O2
	Carpenter		Woodworking (712)-E4, E5	
	Electrician		Electrician (721)-E4, E5	
	Engineer, Stationary		Shipboard Propulsion, Electronic Power, & Utilities, General (65, 662, & 720)-E4, E5	
	Fireman, Stationary Boiler		Main Propulsion (651)-E4, E5	
	Helper, Maintenance Trades		Craftsmen (7)-E1-E3	
	Machine Tool Operator-Toolroom		Machinist (702)-E4, E5	
	Machinist, Maintenance		702-E4, E5	
	Mechanic, Automotive		Automotive, General (610)-E4, E5	

TABLE A-1 (Cont'd)

PATC	AWS	Enlisted	Officer
	Mechanic, Maintenance	Electrical/Mechanical Equipment Repairman (6)-E4, E5	
	Millwright		
	Painter	Construction, General (710)-E4, E5	
	Pipefitter, Maintenance	710 & 720-E4, E5	
	Steel-Metal, Maintenance	Sheetmetal & Other Craftsmen (703 & 790)-E4, E5	
	Tool & Die Maker		
	Guard & Watchman	Military Police, General (830)-E4, E5	
	Janitor, etc.	Stewards & Enlisted Aides, Auxiliary Labor (801 & 85)-E4, E5	
	Laborer, Material Handling	Warehousing & Equipment Handling (822)-E1-E3	
	Order Filler	822-E1-E3	
	Packer, Shipping	822-E1-E3	
	Shipping & Receiving Clerk	Supply Administration (551)-E1-E3	
	Truckdriver	Motor Vehicle Operators (811)-E4, E5	
	Trucker	822-E4, E5	
	Warehouseman	822-E1-E3	

Source: see text.

TABLE A-2

CORRESPONDENCE BETWEEN GENERAL SCHEDULE GRADES AND MILITARY PAY GRADE

Military Pay Grade	General Schedule Grade
E1-E3	GS-2
E4, E5	GS-5
E6, E7	GS-7
E8, E9	GS-9
O1, O2	GS-9
O3	GS-11
O4	GS-13
O5	GS-14
O6	GS-15

The weighting scheme implicitly assumes that wages in all occupations not covered by the PATC and area wage surveys move with the (weighted) average of the wages of all the covered occupations. A more reasonable assumption is that wages in uncovered occupations move with wages in related occupations. Implementing this assumption would require estimating separate indexes for each pay grade - major occupation group combination. Overall indexes would then be a weighted average of the detailed indexes, where the weights were the military employment in each pay grade - major occupation group combination. This procedure was followed only for creating the total force index by combining the total enlisted and total officer indexes. That is, the total enlisted and total officer indexes were estimated separately and then combined using total enlisted employment and total officer employment as weights.

As noted in the text, the figures in tables 8, 9, 13, and 14 overstate the representativeness of the PATC and area wage surveys because they do not consider pay grade. The information in table A-1 can also be used to more accurately calculate representativeness by also considering pay grade. Table A-3 shows the results of that calculation. Considering pay grade reduces the representativeness of the PATC and AWS together to only 32.1 percent of the enlisted force instead of the 58.5 percent shown in table 13. The principal reason for this is that the AWS jobs which represent group 1 and group 6 personnel are only surveyed at one work level representing only pay grades E-4 and E-5.

TABLE A-3

PERCENT OF MILITARY WORK FORCE REPRESENTED BY PATC AND AREA WAGE SURVEYS, PAY GRADE CONSIDERED

Survey	Enlisted Force	Officer Force	Total Force
PATC	8.7%	21.0%	10.3%
Area Wage	24.0	0.6	20.9
Total[1/]	32.1	21.1	30.7

[1/] Total is not the sum of PATC plus area wage because of overlap between the two surveys.

APPENDIX B

"IDEAL" JOB SAMPLES

This appendix describes the "ideal" job samples summarized in tables 20, 21, and 22 in the text. It also contains a complete listing of the distribution of the military work force by 2-digit DoD occupation code.[1]

The DoD occupation codes are the basis for the organization of this appendix. The eight officer occupation groups are considered first. For each group, its composition, the likelihood of finding civilian counterparts, and the subgroups from which survey jobs should be drawn are all addressed. The nine enlisted occupation groups are then treated in the same fashion.

For all groups, two job samples are described. The "supplementary" survey is designed for use in conjunction with the results of the PATC and area wage surveys. The "new" survey could serve, by itself, as the basis for a comparability adjustment.

OFFICER OCCUPATIONS

1. General Officers and Executives, N.E.C.

This group represents 2 percent of the FY 1974 officer force (see table B-1). It includes nearly 90 percent of the general and flag officers (pay grades O-7 and up). Since most general and flag officers hold administrative positions equivalent in responsibility (and, often, function) to corporate executives, in principle it ought to be easy

TABLE B-1

GENERAL OFFICERS AND EXECUTIVES,
POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group	Number	Percent of Occupation Group 1	Percent of Total Officer Force
1A. General and Flag	1,044	18.2%	0.4%
1B. Executives, N.E.C.	4,694	81.8	1.6
Total	5,738		2.0

Source: Service master personnel records as of 30 June 1974.

[1] See references 8 and 9.

to survey comparable jobs in the civilian sector. In practice it would be far more difficult, since executive salaries are a function of the size of the firm as well as responsibility. Further, total executive compensation is usually tied quite closely to the firm's profitability, and hence is quite variable from year to year.[1] While these difficulties could be overcome, it is probably not worth the cost of doing so. Officers, other than general and flag officers, who are included in this group can be adequately represented by administrative occupations with more precise job descriptions. Consequently no jobs in this group should be included in either a supplementary survey or a new survey.

2. Tactical Operations Officers

This group represented 45.1 percent of the officer force in FY 1974. (See table B-2.) It is also one of two groups for which no obvious civilian counterparts exist. One subgroup, "2B. Other Fixed-Wing Pilots," does have a civilian counterpart. However, since pilots currently receive special pay (and are likely to continue receiving it in the future), it seems more reasonable to allow pay for officers in this group to be represented by other officers with closer civilian counterparts. Flight pay could then be used to keep pilots' pay "comparable" (as it ideally is today). Thus no jobs from this group should be included in either a supplementary or new survey.

TABLE B-2

TACTICAL OPERATIONS OFFICERS, POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group		Number	Percent of Occupation Group 2	Percent of Total Officer Force
2A.	Fixed-Wing Fighter and Bomber Pilots	13,644	10.6%	4.8%
2B.	Other Fixed-Wing Pilots	18,485	14.3	6.5
2C.	Helicopter Pilots	11,109	8.6	3.9
2D.	Aircraft Crews	11,252	8.7	3.9
2E.	Ground and Naval Arms	43,578	33.8	15.3
2F.	Missiles	6,891	5.3	2.4
2G.	Operations Staff	23,861	18.5	8.4
	Total	128,820	100.0	45.1

Source: Service master personnel records as of 30 June 1974.

[1] See reference 18.

3. Intelligence Officers

Like the previous one, this group too has no real civilian counterparts. It is also a small group, representing only 3.8 percent of the FY 1974 officer force. (See table B-3.) No jobs from this group should be surveyed either.

TABLE B-3

INTELLIGENCE OFFICERS, POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group	Number	Percent Occupation Group 3	Percent of Total Officer Force
3A. Military Intelligence	6,415	52.9%	2.2%
3B. Communications Intelligence	2,094	19.3	0.7
3C. Counterintelligence	2,332	21.5	0.8
Total	10,841	100.0	3.8

Source: Service master personnel records, as of 30 June 1974.

4. Engineering and Maintenance Officers

This group includes 15 percent of the FY 1974 officer force and is currently represented by only one occupation in the PATC and area wage surveys: "Engineer" in the PATC survey. The bulk of the jobs in this group have obvious civilian counterparts. Table B-4 lists the subgroups in this group and the percent of the officer force they represent. The first four subgroups, 4A through 4D, include nearly 70 percent of the officers and are occupations that should be easily surveyed in the civilian sector. At least two and perhaps as many as five jobs chosen from the first four groups should be included in a supplementary or new survey.

Subgroups 4E and 4F do not have clear civilian counterparts, but all the other subgroups do. If salaries in the less important categories (4G through 4N) move with salaries of engineers in the first four subgroups, then it should not be necessary to survey jobs drawn from the smaller groups. However, this question should be investigated as part of the design of any actual survey.

5. Scientists and Professionals

This group, which includes 5.8 percent of the officer force, is currently represented by two occupations in the PATC survey, "Chemist" and "Attorney." Table B-5 lists the subgroups in this group and their populations. Unlike group 4, this group is a fairly heterogeneous one. Thus no single occupation is likely to be very representative of the

TABLE B-4

ENGINEERING AND MAINTENANCE OFFICERS, POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group		Number	Percent of Occupation Group 4	Percent of Total Officer Force
4A.	Construction and Utilities	4,902	11.5%	1.7%
4B.	Electrical/Electronic	4,271	10.0	1.5
4C.	Communications and Radar	10,922	25.5	3.8
4D.	Aviation Maintenance and Allied	9,204	21.5	3.2
4E.	Ordnance	2,620	6.1	0.9
4F.	Missile Maintenance	1,538	3.6	0.5
4G.	Ship Construction and Maintenance	1,459	3.4	0.5
4H.	Ship Machinery	2,051	4.8	0.7
4K.	Chemical	697	1.6	0.2
4L.	Automotive and Allied	209	0.5	0.1
4M.	Surveying and Mapping	227	0.5	0.1
4N.	Other	4,659	10.9	1.6
	Total	42,759	100.0	15.0

Source: Service master personnel records as of 30 June 1974.

TABLE B-5

OFFICER SCIENTISTS AND PROFESSIONALS, POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group		Number	Percent of Occupation Group 5	Percent of Total Force
5A.	Physical and Mathematical Scientists	2,328	14.1%	0.8%
5B.	Meteorologists	2,093	12.6	0.7
5C.	Biological Scientists	534	3.2	0.2
5D.	Social Scientists	218	1.3	0.1
5E.	Psychologists	546	3.3	0.2
5F.	Lawyers	4,263	25.8	1.5
5G.	Chaplains	3,359	20.3	1.2
5H.	Social Workers	381	2.3	0.1
5K.	Educators and Instructors	1,890	11.4	0.7
5L.	Research and Development Coordinators	941	5.7	0.3
	Total	16,553	100.0	5.8

Source: Service master personnel records as of 30 June 1974.

entire group. Since all of the subgroups have obvious civilian counterparts, it is not possible to eliminate any of them as potential survey jobs on the grounds that they are unsurveyable. Nevertheless, because of the small size of all the subgroups, it does not seem reasonable to survey all of them.

The last two subgroups, "5K. Educators and Instructors" and "5L. Research and Development Coordinators," consist of either teaching professionals, whose salaries would probably be adequately represented by salaries of their non-teaching counterparts, or administrators who would be represented by other administrators or professionals. Therefore, no job from these last two subgroups should be surveyed. As part of a supplementary survey, one job should be drawn from subgroup 5D, 5E, or 5F (to represent the social scientists and related professionals) or one from group 5G ("Chaplains"). As part of a new survey, lawyers should be surveyed (as is currently done by the PATC survey) and one job should be drawn from group 5A or 5B (to represent the physical, biological, and mathematical scientists). Thus a supplementary survey would contain one job and a new survey would contain three jobs from group 5.

6. Medical Officers

This group represents 9.1 percent of the officer force, with the bulk of these (over 80 percent) being physicians and dentists. (See table B-6.) Because their civilian pay is so much higher than other professionals, it would probably be a mistake to include physicians and dentists in any survey. Thus no jobs from this group should be included in either a supplementary or new survey. Medical officers will probably continue to draw special pays in the foreseeable future, and these pays, at least in principle, should be sufficient to maintain "comparability" for this group.

TABLE B-6

MEDICAL OFFICERS, POPULATION
AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group	Number	Percent of Occupation Group 6	Percent of Total Officer Force
6A. Physicians	14,670	56.6%	5.1%
6C. Dentists	6,218	24.0	2.2
6E. General Nurses	1,072	4.1	0.4
6F. Nursing Specialists	1,224	4.7	0.4
6G. Veterinarians	889	3.4	0.3
6H. Allied Medical	1,849	7.1	0.6
Total	25,922	100.0	9.1

Soruce: Service master personnel records as of 30 June 1974.

7. Administrators

After Tactical Operations Officers, and Engineers, this group, which represents 13.1 percent of the FY 1974 officer force, is the largest occupation group. It is represented by seven jobs in the PATC and area wage surveys. Table B-7 lists its subgroups. Subgroup 7C ("Manpower and Personnel") is represented by one job in the PATC survey ("Personnel Director"); subgroup 7D ("Comptrollers and Fiscal") by three ("Accountant," "Auditor," and "Chief Accountant"); and subgroup 7E ("Data Processing and Statistics") by one job in the PATC survey ("Computer Operator") and two in the AWS ("Computer Programmer" and "Computer Systems Analyst"). Because this is a relatively large group, at least two and perhaps three additional occupations should be included in a supplementary survey. One should be a general administrative position (to represent subgroup 7A) and the other, if possible, should be a police, security, or correctional administrator (to represent subgroup 7H). If an additional occupation is surveyed it should be drawn from subgroup 7B ("Training Administrator") or 7M ("Medical Administrator"). A new survey should include these two or three occupations plus one drawn from each of subgroups 7C, 7D, and 7E, for a total of five or six jobs.

TABLE B-7

OFFICER ADMINISTRATORS, POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group	Number	Percent of Occupation Group 7	Percent of Total Force
7A. Admininstrators, General	9,449	25.3%	3.3%
7B. Training Administrators	3,281	8.8	1.2
7C. Manpower and Personnel	6,252	16.7	2.2
7D. Comptrollers and Fiscal	3,779	10.1	1.3
7E. Data Processing and Statistics	3,833	10.2	1.3
7F. Pictorial	384	1.0	0.1
7G. Information	1,376	3.7	0.5
7H. Police	3,351	9.0	1.2
7K. Safety	798	2.1	0.3
7L. Inspector General	76	0.2	*
7M. Medical Administrators	4,171	11.2	1.5
7N. Other	595	1.6	0.2
Total	37,345	100.0	13.1

*Less than 0.1 percent.

Source: Service master personnel records as of 30 June 1974.

8. Supply, Procurement and Allied Officers

Table B-8 lists this group's subgroups. Currently, one subgroup, 8D, is represented in the AWS or PATC survey (by "Buyer" in the PATC survey). Two occupations from the first three subgroups should be included in a new survey. Being more specific here is difficult because it is not obvious how easy it will be to find civilian counterparts for these occupations. While subgroups 7C and 7D ("Transportation" and "Procurement and Production") have clear civilian counterparts, this is not so true of subgroups 7A and 7B ("Logistics, General" and "Supply"). Unfortunately, these first two subgroups include over half of group 8 officers so every effort should be made to represent them.

TABLE B-8

SUPPLY, PROCUREMENT AND ALLIED OFFICERS,
POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group	Number	Percent of Occupation Group 8	Percent of Total Officer Force
8A. Logistics, General	4,311	24.8%	1.5%
8B. Supply	6,782	39.0	2.4
8C. Transportation	2,872	16.5	1.0
8D. Procurement and Production	2,465	14.2	0.9
8E. Food Service	400	2.3	0.1
8F. Exchange	258	1.5	0.1
8G. Other	322	1.8	0.1
Total	17,410	100.0	6.1

Source: Service master personnel records as of 30 June 1974.

ENLISTED OCCUPATIONS

0. Infantry, Gun Crews and Seamanship Specialists

This group includes 20.6 percent of the total enlisted force and is the only enlisted group for which no obvious civilian counterparts exist. Of this group, however, over one-third are E-1s, E-2s, and E-3s who have no specific occupation group (DoD code "00," see table B-9). In other words, these are individuals (virtually all of whom will be in their first two or three years of service) with no specific skills. It can be argued that they are basically unskilled labor. If possible, two or three "representative" unskilled jobs should be sampled in the civilian sector to represent these people.

TABLE B-9

ENLISTED INFANTRY, GUN CREWS, AND SEAMANSHIP SPECIALISTS, POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group		Number	Percent of Occupation Group 0	Percent of Total Enlisted Force
00.		154,860	40.2%	8.3%
01.	Infantry	105,377	27.3	5.6
02.	Armor and Amphibious	20,556	5.3	1.1
03.	Combat Engineering	18,791	4.9	1.0
04.	Artillery/Gunnery, Rockets and Missiles	50,095	13.0	2.7
05.	Combat Air Crew	3,082	0.8	0.2
06.	Seamanship	32,572	8.5	1.7
	Total	385,333	100.0	20.6

Source: Service master personnel records as of 30 June 1974.

Another 8.5 percent of this group are the Navy's seamanship specialists (boatswains, navigators, etc.) for whom civilian counterparts in the merchant marine presumably exist. One occupation should be surveyed to represent these jobs -- again, if possible.

1. Electronic Equipment Repairmen

This group, which includes 11.3 percent of the FY 1974 enlisted force, is one of the largest enlisted occupation groups. Table B-10 lists its subgroups. It is currently represented by one occupation in the area wage surveys, "Electronics Technician." Subgroups 11, 12, and 14, which together account for 23.7 percent of this group may have no civilian counterparts, but all the others do. Consequently, two or three jobs from subgroup "10. Radio/Radar," the single largest subgroup, and one other job drawn from subgroup 13, 15, or 16 should be surveyed as part of a supplementary survey. For a new survey another job, from subgroup 19, should be surveyed in addition to these.

2. Communication and Intelligence Specialists

The subgroups for this group are listed in table B-11. While the first three subgroups have civilian counterparts, the others do not. Fortunately, these first three subgroups account for over half of the personnel in the group. The group is not represented by any jobs in the PATC or area wage surveys. Consequently, two jobs for this group should be included in either a supplementary or new survey. One of these jobs should be drawn from subgroup 20 and the other from subgroup 22.

TABLE B-10

ENLISTED ELECTRONIC EQUIPMENT REPAIRMEN, POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group	Number	Percent of Occupation Group 1	Percent of Total Enlisted Force
10. Radio/Radar	109,989	51.8%	5.9%
11. Fire Control Electronic Systems (Non-Missile)	15,797	7.4	0.8
12. Missile Guidance, Control and Checkout	27,544	13.0	1.5
13. Sonar Equipment	6,949	3.3	0.4
14. Nuclear Weapons Equipment	2,228	1.0	0.1
15. ADP Computers	8,816	4.2	0.5
16. Teletype and Cryptographic Equipment	16,183	7.6	0.9
19. Other Electronic Equipment	24,812	11.7	1.3
Total	212,318	100.0	11.3

Source: Service master personnel records as of 30 June 1974.

TABLE B-11

ENLISTED COMMUNICATIONS AND INTELLIGENCE SPECIALISTS, POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group	Number	Percent Occupation Group 2	Percent of Total Enlisted Force
20. Radio and Radio Code	42,307	31.3%	2.3%
21. Sonar	4,136	3.1	0.2
22. Radar and Air Traffic Control	29,955	22.2	1.6
23. Signal Intelligence/ Electronic Warfare	29,404	21.8	1.6
24. Military Intelligence	13,700	10.1	0.7
25. Combat Operations Control	15,494	11.5	0.8
Total	134,996	100.0	7.2

Source: Service master personnel records as of 30 June 1974.

3. Medical and Dental Specialists

This is a relatively small group -- it includes only 4.3 percent of the total FY 1974 enlisted force -- with obvious civilian counterparts: medical and dental technicians. Table B-12 lists its subgroups. It is not represented by any jobs in the PATC survey or the AWS. Two jobs from this group should be included in either a supplementary or a new survey. One of these should be a job drawn from subgroup "30. Medical Care," which includes 68 percent of the total group population. The other should be drawn from one of the other three subgroups ("31. Technical Medical Services," "32. Related Medical Services," or "33. Dental Care").

TABLE B-12

ENLISTED MEDICAL AND DENTAL SPECIALISTS, POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group	Number	Percent of Occupation Group 3	Percent of Total Enlisted Force
30. Medical Care	54,297	68.1%	2.9%
31. Technical Medical Services	11,093	13.9	0.6
32. Related Medical Services	5,454	6.8	0.3
33. Dental Care	8,911	11.2	0.5
Total	79,755	100.0	4.3

Source: Service master personnel records as of 30 June 1974.

4. Other Technical and Allied Specialists

This is the smallest enlisted occupation group, representing only two percent of the total enlisted force. As shown in table B-13, it includes a varied group of occupations such as photographers, drafters, technical assistants in the physical, biological, and engineering sciences, ordnance disposal specialists, divers, and musicians. It is currently represented by three PATC jobs ("Drafters," "Chemist," and "Engineer") and one AWS job ("Drafters"). Thus, no jobs from this group need be included in a supplementary survey. A new survey should include one job from this group. Because it is such a heterogeneous group, it is hard to know what subgroup that job should be drawn from. The two most obvious choices, though, are subgroups 40 ("Photography") and 41 ("Drafting, Surveying, and Mapping"). These two subgroups are of roughly equal size and together account for 52 percent of the group. No other subgroup (there are five others) accounts for more than 18 percent of the total group.

TABLE B-13

ENLISTED OTHER TECHNICAL AND ALLIED SPECIALISTS,
POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group		Number	Percent of Occupation Group 4	Percent of Total Enlisted Force
40.	Photography	9,936	26.8%	0.5%
41.	Drafting, Surveying and Mapping	9,386	25.3	0.5
42.	Weather	6,596	17.8	0.4
43.	Ordnance Disposal and Diving	2,514	6.8	0.1
44.	Scientific and Engineering Aids	1,418	3.8	0.1
45.	Musicians	4,643	12.5	0.2
49.	Technical Specialists, N.E.C.	2,559	6.9	0.1
	Total	37,052	100.0	2.0

Source: Service master personnel records as of 30 June 1974.

5. Administrative Specialists and Clerks

This is one of the largest enlisted occupation groups and includes 16.6 percent of the total force. It is also the most heavily represented group in the PATC and area wage surveys. Table B-14 lists its subgroups. Subgroup 50 is represented by one PATC job; subgroup 51 by ten jobs, five from the PATC survey and five from the AWS; subgroup 53 is represented by two PATC jobs and five AWS jobs; subgroup 54 by three PATC jobs and three AWS jobs; and subgroups 55 and 58 are each represented by one AWS job. Only subgroups 52, 56, and 57, together amounting to only 6.7 percent of the total group, are not represented by jobs in either the PATC or area wage surveys. Consequently, no jobs from this group should be included in a supplementary survey.

A new survey should initially include eight to ten occupations from this group. Experience may show that salaries among occupations in this group move together in a close enough way to eventually reduce this number. One or two survey jobs should be chosen to represent occupations in subgroup 50. Subgroups 53, 54, and 58 should each be represented by one survey job. Because of their size, subgroups 51 and 55 should be represented by at least two jobs each but subgroup 55 is homogeneous enough that one job may be sufficient. This question should be addressed in detail when an actual survey is designed.

Subgroup 51 is more heterogeneous. Table B-15 lists its subdivisions. Either two jobs from this subgroup should be drawn from subdivision 510 (because of its size and generality) or one job should be drawn from each of subdivisions 510 and 514 (again,

TABLE B-14

ENLISTED ADMINISTRATIVE SPECIALISTS AND CLERKS, POPULATION AND PERCENT DISTRIBUTION, FY 1974

DOD Occupation Group	Number	Percent of Occupation Group 5	Percent of Total Enlisted Force
50. Personnel	53,393	17.2%	2.8%
51. Administration	104,470	33.6	5.6
52. Clerical Personnel	8,494	2.7	0.5
53. Data Processing	19,109	6.2	1.0
54. Accounting, Finance and Disbursing	15,656	5.0	0.8
55. Supply and Logistics	71,365	23.0	3.8
56. Religious, Morale and Welfare	5,691	1.8	0.3
57. Information and Education	6,948	2.2	0.4
58. Communications Center Operations	25,562	8.2	1.4
Total	310,688	100.0	16.6

Source: Service master personnel records as of 30 June 1974.

TABLE B-15

ENLISTED ADMINISTRATION, POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group	Number	Percent of Occupation Group 51	Percent of Occupation Group 5	Percent of Total Enlisted Force
510. Administration, General	68,329	65.4%	22.0%	3.6%
511. Stenography	2,036	1.9	0.7	0.1
512. Legal	3,516	3.4	1.1	0.2
513. Medical	4,545	4.4	1.5	0.2
514. Transportation	10,432	10.0	3.4	0.6
515. Postal	3,064	2.9	1.0	0.2
516. Aviation Maintenance Records and Reports	7,480	7.2	2.4	0.4
517. Flight Operations	5,068	4.9	1.6	0.3
Total	104,470	100.0	33.6	5.6

Source: Service master personnel records as of 30 June 1974.

because of their size). If the latter alternative is chosen, perhaps a third job, also drawn from subdivision 510, should be included.

6. Electrical/Mechanical Equipment Repairmen

This is the largest occupation group. It includes nearly one-fourth of the total enlisted force, and one of its subgroups, "60. Aircraft," is larger than all but two of the other major occupation groups. Table B-16 lists the subgroups for group 6. Only four jobs from the AWS represent occupations in this group. Thus either a supplementary or a new survey should include a number of jobs from this group.

Because of its importance, subgroup 60 should be represented by at least three, and perhaps as many as six, survey jobs. The jobs could be chosen on the basis either of function (airframe, engine, or accessories) or aircraft type (helicopter; fixed-wing, propeller; or fixed-wing, jet). The subgroup is subdivided along functional lines, but the largest subdivision, "600. Aircraft, General," which includes nearly two-thirds of the total subgroup, does not appear to be homogeneous in work-type. This is clearly an area that will have to be studied in considerable detail as part of any survey design.

Again because of their size, subgroups 61, 62, 65, and 66 should all be represented by at least one job each and perhaps an additional job from subgroup 61. The size of subgroup 64 also warrants including a representative job in any survey. It may be difficult to find civilian counterparts, however. The only obvious civilian job is "Gunsmith," but "Small Arms Repair" (subdivision 641) includes less than 5 percent of the total subgroup 64 population. The two largest subdivision, "645. Ammunition Repair" and "646. Aviation Ordnance," which together represent about three-fourths of the subgroup, do not have any obvious civilian counterparts. Thus it will probably not be possible to survey a job representative of subgroup 64. It should be considered, however.

In summary, then, a new survey should include three to six jobs from subgroup 60, one job from each of subgroups 61, 62, 65, and 66, and, if possible, subgroup 64 as well. Subgroups 61, 65, and 66 (as well as a fourth, more general occupation, "Maintenance Mechanic") are represented in the AWS. Thus a supplementary survey need contain only the three to six jobs from subgroup 60 and one job from subgroup 62.

7. Craftsmen

This is a relatively small group (it includes only 4.9 percent of the FY 1974 enlisted force) and it is well represented in the AWS by nine occupations. For this reason, no jobs from this group need be included in supplementary survey.

Table B-17 lists the subgroups in this group. As the table shows, with the exception of subgroups 74, 75, and 76, none of the subgroups is particularly large or small relative to the others. Thus, while the group should be represented by two or three

TABLE B-16

ENLISTED ELECTRICAL/MECHANICAL EQUIPMENT REPAIRMEN, POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group	Number	Percent of Occupation Group 6	Percent of Total Enlisted Force
60. Aircraft	216,748	50.5%	11.6%
61. Automotive	60,183	14.0	3.2
62. Wire Communications	27,101	6.3	1.4
63. Missile Mechanical and Electrical	6,383	1.5	0.3
64. Armament and Munitions	36,848	8.6	2.0
65. Shipboard Propulsion	38,442	8.9	2.1
66. Power Generating Equipment	31,790	7.4	1.7
67. Precision Equipment	3,891	0.9	0.2
68. Aircraft Launch Equipment	5,972	1.4	0.3
69. Other Mechanical and Electrical Equipment	2,196	0.5	0.1
Total	420,554	100.0	22.9

Source: Service master personnel records as of 30 June 1974.

TABLE B-17

ENLISTED CRAFTSMEN, POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group	Number	Percent of Occupation Group 7	Percent of Total Enlisted Force
70. Metalworking	15,480	16.8%	0.8%
71. Construction	16,002	17.4	0.9
72. Utilities	22,318	24.3	1.2
73. Construction Equipment Operation	13,468	14.6	0.7
74. Lithography	2,545	2.8	0.1
75. Industrial Gas and Fuel Production	1,268	1.4	0.1
76. Fabric, Leather and Rubber	1,221	1.3	0.1
78. Firefighting and Damage Control	9,739	10.6	0.5
79. Other Craftsmen, N.E.C.	9,976	10.8	0.5
Total	92,017	100.0	4.9

Source: Service master personnel records as of 30 June 1974.

jobs, it is not obvious from which subgroups to draw jobs for a new survey. All have obvious civilian counterparts and all (with the exceptions noted above) are of roughly the same size. Subgroups 71, 72, and 73, however, are probably closely related. Therefore, one survey job should be drawn from subgroups 71, 72, and 73 together. Another job should be surveyed, representative of subgroup 70. If a close civilian counterpart can be found, a third job should be surveyed, representative of subgroup 78. A new survey, then, would contain two or three jobs from this group.

8. Service and Supply Handlers

This group includes 10.3 percent of the enlisted force. Its subgroups are shown in table B-18. It is currently represented by seven AWS jobs: one each from subgroups 80, 81, 83, and 85, and three from subgroup 82. No more than three jobs should be included in a supplementary survey. There should be one drawn from each of subgroups 80, 81, and 83. For a new survey four more jobs should be surveyed, one from each of subgroups 80, 81, 82, and 83. A new survey would thus have seven jobs from this group while a supplementary survey would have three.

TABLE B-18

ENLISTED SERVICE AND SUPPLY HANDLERS,
POPULATION AND PERCENT DISTRIBUTIONS, FY 1974

DOD Occupation Group	Number	Percent of Occupation Group 8	Percent of Total Enlisted Force
80. Food Service	46,552	24.1%	2.5%
81. Motor Transport	39,991	20.7	2.1
82. Material Receipt, Storage and Issue	28,037	14.5	1.5
83. Military Police	65,755	34.1	3.5
84. Personal Services	1,376	0.7	0.1
85. Auxiliary Labor	3,426	1.8	0.2
86. Forward Area Equipment Support	7,715	4.0	0.4
Total	192,852	100.0	10.3

Source: Service master personnel records as of 30 June 1974.