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TARIFF COMPUTERIZATION, STANDARDIZATION AND SIMPLIFICATION: THE STATE OF THE ART AND ITS POLICY IMPLICATIONS FOR THE DEPARTMENT OF TRANSPORTATION

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FINAL REPORT

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Abstract

The state of the art of tariff simplification/computerization/standardization s reviewed. Emphasis is placed on rail and motor tariffs for domestic freight. ources of difficulty in the present tariffs and their application to freight ills are examined. Methods of coping with these difficulties are described, specially those using computerized rating systems. Recommendations are ade for future DOT activities in this area. These include development of formula rate tariff, feasibility studies of rate "utilities" and shipper-arrier newtorks, tariff standardization studies, and coordination of govern-ent tariff research.

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PREFACE

This work was performed at the request of Harold Harriman of the Office of Facilitation under PPA OE405 with matching internal funds under PPA OS443. At the initial meeting of the public and private transportation organizations it was decided that efforts in tariff simplification/standardization/computerization should be surveyed and potential activities identified which offered a high payoff for the freight transportation community. It was recognized that the brevity of the first research period would limit the scope of the survey. As a result, this report is predominantly about large firms and domestic surface freight transport. It is intended that this report, with the cooperation of the public and private transportation groups, will lead to a broader survey of current methods and actual cost analysis of the alternatives.

FOREWORD

The Office of Facilitation of DOT has encouraged improvements in the processing of shipment information by means of its CARDIS program. In FY74, this Office contracted with the Transportation Systems Center to initiate studies into the effect of freight rates and tariffs on the overall documentation problem. The first stage of the project was to be a survey of the state of the art of tariff standardization/simplification/computerization, with identification of emerging trends and of potential policies. Although this first report reflects the extremely brief period alloted to the first stage, it reflects many of the current activities in rating. Because there are so many diverse viewpoints in this area, it is expected that certain sections of the report may be sharply criticized. Hopefully, this interaction will make the next stage of the research more realistic and more sensitive to the actual needs of the industry.

The author expresses his gratitude to the many people who assisted him in the project. At TSC Ken Troup's previous work in the use of information systems with the transportation industry was an excellent starting point, while the critical review of the writing by Santo LaTores, Bob Church, and Bill Duffy was very helpful. Transportation professionals were also responsive to the requests for reports, data, and background material. Among those who assisted were: Dr. Grosvenor Plowman, Al Wharton, Ernie Olson, Jim Greene, Ed Guilbert, Tom Desnoyers, Joe Goldman, Ginger Levin, Bob Petrash, Dick Hinchcliff, Herb Whitten, Dave Grumhaus, Tom Harris, Merrill Simpson, Lenny Duggan, Cliff Buys, John Loxton, Mickey Curtin, Bob Walker, Lynn Stauffer, Tom Nestor, Doug Warner, Tony D'Anna, Gerald Wheatley, Don Johnston, Dale Furnas, Ed Kreyling, Bob Aronson, Roland Jones, Dick Velten, Bob Lenzi, Edgar Martin, Al Martin, Pete Smith, Alan Godes, Neil Cleary, Tom Yarmas, Ken Russell, and Dr. Rahbany. The typing of Mrs. Charlotte Lowe, Vera Ward, Jacqueline Dobson, and Dona Cook was appreciated, especially in the face of their heavy year-end workload.

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1. INTRODUCTION

This report deals with a major source of difficulty in the documentation which accompanies freight shipments in the United States: the freight rates, with their relevant tariffs, used by common carriers. Difficulties associated with the retrieval of the proper rate and with construction of the freight charge are enumerated. Following this, current methods of dealing with these problems are described. Trends evolving from the current situation are identified along with their policy implications in the near future. Finally, potential activities are suggested that DOT could pursue in order to facilitate progress in the industry.

There is little doubt that a paperwork problem exists for many shippers, carriers, publishers, and service agencies. As a general index of the seriousness of the problem, one need only review the many speeches on the subject in the last fifteen years. The paperwork, or documentation, accompanying both domestic and international shipments has been described as inefficient and costly. In addition to its own high cost, it creates further costs by impeding progress in other aspects of transportation information processing, such as real-time shipment tracing or sophisticated distribution analysis.

One aspect of shipment documentation which is particularly criticized is the rating function: the retrieval of the correct rate and construction of the freight charge on a freight bill (F/B). The critical nature of the rating function within the overall problem is shown by the decision of many firms to invest large amounts, sometimes millions of dollars, in improving their rate handling. This demonstrates a growing need - in economic terms, an effective demand - for better methods of handling freight rates in the transportation industry.

The paperwork problem and the rating problem do not apply evenly throughout transportation. Some carriers and shippers have little difficulty with them. For example, a shipper who always deals in the same few commodities and markets would be able to

reference the correct rates easily, simply through having used them many times. For other transportation users, greater problems might far outweigh the costs of documentation. As one small manufacturer of automated stitching machinery put it, "I don't mind the freight rates or tariffs so much, I just wish they'd pick up my stuff on time and quit damaging it."

In the overall study it will be necessary to assess the magnitude of the rating problem, the impact it has on various users, the causes of the problem, and the current methods of coping with it. It will be critical to ascertain the important trends within the emerging rating systems if the optimal policies are to be found. As a first step, the state of the art of freight rate standardization, simplification, and computerization was surveyed. Beyond a straightforward cataloguing of individual projects, the survey tried to determine which users found the rating problem excessive and which did not. Some of these distinctions emerge in this initial report, although much research remains to be done.

It became obvious that the rate problem could be approached in many ways, depending on the researcher's frame of reference. One could encourage marginal improvements while leaving the tariffs unchanged or, at the other extreme, one could suggest fundamental structural change in freight rates. The primary focus of this work is not the rate level or rate structure. Rather, it deals with the use of rates in freight shipments - rate processing.[1]

Two other biases should be noted. First, it has been the unfortunate experience of some academicians (and some nonacademician to propose alteration in the rates without considering the extreme sensitivity of the massive pricing structure that these rates represent. A change of a few pennies per hundred-weight in a set of rates could make a plant uneconomical or could shift traffic from one mode to another. Therefore, we have accepted the current set of prices as they stand. This does not mean that we accept the way that the prices are published or are computed in a shipping transaction.

Secondly, we have assumed that the profit incentive is the best guide to an individual firm's decisions, within the guidelines of national transportation policy. Therefore, we have preferred solutions which would build from the bottom up, allowing individual firms to solve their own internal problems. This is in contrast to policy directed downward, such as the implementation of progressive efforts through legislation.

2. CURRENT PROBLEMS IN RATING

A layman reading the conference proceedings and articles on computerization in transportation which appeared during the 1960's would get the impression that great strides in automated rating, billing, and payment systems were around the corner. While it was recognized that the publication, storage, and retrieval of rates entailed certain technical difficulties, overall confidence was high that solutions were imminent. Computer firms were eager to investigate the problem, carriers and private shippers were funding exploratory efforts, and federal government shippers were negotiating for simpler rate structures to alleviate their payment and audit problems.[2]

The actual progress has been modest. There are existing Computerized Rating (CR) systems which handle all or some of the rating of shipments for shippers and carriers. Most firms, though use essentially the same rating methods that they have used for many years. This suggests that the costs and benefits of converting from manual to CR systems may have been misunderstood by the early enthusiasts, since the majority of the firms have not found it profitable to make this conversion.

In an attempt to get at these true costs, we interviewed shippers, carriers, and others concerned with rates. The key piec of information would have been the transaction cost, i.e., the monetary cost of rating a freight bill or quoting a rate. Very fe references to this specific cost have been published.[3] Even if estimates of these costs were available, they would have to be judged within the context of the particular firm's operations, since rating is never performed as an end in itself but rather as a part of a broader operation. The particular steps in the rating billing-auditing sequence will vary from firm to firm. Since no estimates were forthcoming on the costs of the transactions to the firms, the interviewees were asked about two items which seemed to be good proxies of the seriousness of the rating problem:[4] the percentage of freight bills in error and the amount of overage/

underage claims. Surprisingly, there were few specific answers to even these questions. Either the firms had not developed such primary figures or they were unwilling to reveal them. The responses are summarized in Table 1.

TABLE 1. ESTIMATES OF THE PERCENTAGE OF F/B's IN ERROR

Source	Estimate
1. Large shipper	30 percent of a large sample had an incorrect freight charge. Overcharges and undercharges were evenly distributed.
2. Large shipper	34 percent of sample of 3,000 were incorrect in freight charge, counting both overs and unders.
3. Large shipper	Using a $10 minimum rule, a 1-month sample showed issuance of overcharge claims on 20 percent of F/B's. This was felt to be usual; 10 percent more 'average'. A 9-month sample showed overage claims on 12 percent of F/B's.
4. Service agency	Average of 15 percent with wide variation among carriers.
5. Service agency	14 percent errors among rated F/B's 70 percent of these are overcharges.
6. Large Carrier	27 percent F/B's wrong in sample of 200.

Even though the responses were not obtained by direct measurement in a controlled environment, they still offer evidence that many firms in the transportation industry operate at an error rate of 20 percent or more on their freight bills. "Error rate" refers to the percentage of freight bills having an incorrect freight charge. Four main causes were suggested by the interviewee: 1) the filling out of the original bill of lading, 2) the act of rating the freight bill by the carrier, 3) the structure of the tariffs and 4) the method of making changes in tariffs.

(1) The filling out of the bill of lading was identified as a prime source of error by nearly half of those interviewed. Errors can and do occur in the recording of the commodity description, in the weight, and in the notes and special conditions. The commodity description itself is often written improperly and even when it is correct, "commodity descriptions in freight classifications and other tariffs are known for their inconclusiveness and ambiguity."[5] It was reported that an early attempt at computerizing all motor freight tariffs was able to match only 35 percent of the commodity descriptions on a large sample of bills of lading with the descriptions stored in a computer. Since the bill of lading (B/L) is the initial source of shipment information, many developers of CR systems have stated that the quality of the bills of lading would have to be first improved to permit efficient processing.

(2) The act of rating a freight bill often occurs under circumstances which produce further errors. Rating is still done by most carriers in a decentralized manner using semi-skilled clerks. A large number of freight bills may have to be rated in the course of several hours, giving little incentive to spend time on the occasional difficult item.

Lack of central control and of experienced ratemen contribute to a high error rate. The problem of training and keeping skilled ratemen has been described as serious by private shippers, government shippers, rail carriers, and motor carriers. Bright young people have little interest in working in the rate room due to the cumbersome nature of the tariffs and the perceived low status of t traffic department in corporations. If it is difficult to cope with the rating process now and if the quality of ratemen declines while the volume of traffic and of tariff changes increas the problem will only get worse.

(3) The application of tariffs to rating freight bills can b difficult because of the way that the information is structured in the tariffs. There is no guarantee that a search of class and commodity rates by mode, territory, commodity, origin, destinatior

and rate will produce the final correct rate. One report on tariff computerization stated that:

> Part of the problem ... was determined to be caused by the unwieldy structure of the tariff library. In any rate search there is a fixed number of basic variables that normally come into play, i.e., origins, destinations, and commodities. However, the search criteria, whether manual or by computer, involves many different tariffs that contain items that fit the variables in question. A graphic example of this problem was developed by research performed in conjunction with FMC Corporation and the Manufacturing Chemists Association. This research indicated that the necessary rate information maintained by a company on six commodities being shipped from 39 different origins requires a rail tariff library of 91 different tariffs .....[6]

This complexity and ambiguity make the determination of a unique rate very difficult in some cases. Indeed, there are rate specialists who audit freight bills (F/B) looking for high or low charges in return for a percentage of the refund claimed. These auditors, sometimes referred to as rate "sharks", can often find a new interpretation or combination of the waybill information which will result in a different legal rate than that on the F/B.

Some of the people interviewed cynically referred to the correct' rate as the lowest one accepted to date. Examples of difficult tariff applications include multiline movements, transit' movements, mixed shipment deficit weight rules, and special carrier agreements or exceptions. Other classic rate problems are the aggregation of intermediates and the long and short haul rules.[7] Even so, rateman may deny that the existing tariffs are difficult to apply. Since most traffic is repetitive, even difficult rates can be calculated once and stored for future use. However, this rate "guide" or rate "pony" must still be updated during the frequent rate changes, which requires a significant effort. Furthermore, the rise of such practical devices has not solved the rating and auditing problem for many shippers and carriers, as Table 1 indicates.

Another indirect proof of the problematic nature of tariffs is the difficulty with which they are computerized. Putting such a massive data problem on the computer requires formalization of the data formats and of the rules by which the user operates. Early efforts at actually reproducing a ratemen's search were unsuccessful, due not to technical limitations in the computers but to the inability to logically index the various items in the tariffs. As many CR managers have expressed it, the major difficulty in storing, retrieving, and updating is the lack of a consistent 'hook' (index to the rate information).

Such an index has been attempted in the new Canadian Freight Association Tariff 600. This index is called SIN (Single Item Number) and offers a unique identifier for each shipment by commodity, origin, destination and weight. (See Figure 1.) Each user of SIN notifies the Association as to the SIN numbers they are using. Following that, any tariff changes affecting these particular shipments are sent to the user but other changes are not. Therefore, SIN is helpful in tariff updating and in rate retrieval. It must be noted that SIN does not improve the actual computation of a freight charge nor does it do away with notes, exceptions, and other items which affect the rate search.

(4) There are also problems arising from the tariff publication format and procedure. Since tariffs serve a legal function as well as a pricing one, the specific numbers printed in the page are the correct ones. This means that rate pages which began as scales (a relationship in price and distance) have often become distorted during general increases because of rounding effects or clerical error.[8] The new tables do not reflect the original numerical relationship but have become large sets of unrelated numbers.

Another hurdle to easy access to the correct rate is the tendency to publish tariff supplements rather than reprinting the tariff. This engenders a rate search wherein three, four, or more pages must be referenced after the original rate is found. Also there are usually ex parte increases already in effect by the time

ITEM 18550C(S9) **STCC 3241115** **ITEM 18550C(S9)**

CEMENT, AS DESCRIBED IN ITEM 18540.

FROM STATION	SPLC	TO STATION	SPLC	RATES COL. A	RATES COL. B	ROUTE	CODING FOR SIN
NB Havelock	015588	ME Madawaska	111003	64	64	766	18550-GC
ON Clarkson	044742	MI Detroit	318100	63	63	6	18550-GF
ON Clarkson	044742	NY Massena	170511	(2) 67	(2) 67	4	18550-GJ
ON Picton	042036	NY Buffalo-Black Rock	185405	46	46	10	18550-GK
ON Picton	042036	NY Cheektowaga	185371	46	46	10	18550-GL
ON Picton	042036	NY Depew	185375	46	46	10	18550-GM
PQ Montreal	030000	CT Eagleville	162168	59	59	724	18550-GN
PQ Montreal	030000	CT Farmington	163433	67	64	(H4)	18550-GP
PQ Montreal	030000	CT Hartford	163240	61	60	(H4)	18550-GS
PQ Montreal	030000	CT Montville	165254	60	60	724	18550-GW
PQ Montreal	030000	CT New Haven	167530	67	64	(H4)	18550-GX
PQ Montreal	030000	CT Norwich	165220	60	60	724	18550-GZ

(2) INCLUDES MASSENA TERMINAL RY. SWITCHING.
(H4) VIA ROUTES 10, 20, (P) 66.
(EC.31743)

Figure 1. "Coding for SIN." Each of These Shipments is Uniquely Identified for Rating or Updating Purposes

that a tariff is re-published, meaning that the rate must be checked against each set of notes for possible further computation. The rate on a rate page is often an index to the real price, not the price itself.

The tariff publication cycle that rail and motor rates require adds uncertainty to the quotation of the proper rate. Filing an ex parte increase often creates just an interim rate, pending final ruling by the I.C.C.. In the meantime, the rate room must maintain several sets of rates to keep their sales people informed.

The ICC has been working on these problems with good results. Several ratemen commented that scales are maintained more accurately in recent general increases. Also, carriers have been encouraged to republish older tariffs rather than to extend a large number of supplements. A recent problem beyond the powers of the Commission has been the frequency of rate increases.

In summary, the discrepancy between the hopes of the 1960's and the continuing problems of today is difficult to explain. If the present methods are cumbersome and inefficient, why aren't they changed? If the present tariffs are confusing and ambiguous, why aren't they revised and standardized? Some answers have been suggested earlier. One set of answers refers to the high cost of changing elements in the rate and tariff complex. These emphasize the actual costs of resources - staff, hardware, etc.. An alternate explanation focuses on the environment within which tariffs are used. Ernest Olson of the ICC has stated this position:

> Without a deep perception of the fundamentals of the rate tariff publication 'system', the rate bargaining procedure and folk customs, the flexibility in ratemaking and the economic opportunities and consequences which shippers and carriers measure in negotiating and formulating rates and rate structure in the regulatory framework, the hoped-for objective (tariff computerization) will be virtually impossible to achieve.[9]

The existing tariffs fill certain needs. The problems with commodity classifications, for example, become understandable when it is realized that one method of achieving a preferable rate is b)

TABLE 2. INDICATIONS OF THE VOLUME OF TARIFF CHANGES

Name	Type of Rates	Number of Changes
GAO	all types	1967 figures showed 200 new tariffs and 36,000 supplements monthly on 50,000 tariffs overall.
'hillips P.	mainly commodity	From Jan. to June 1974 their computer rate file containing 225,000 rates had received changes in 2,500,000 individual rate items.
rairie Village ommodity Office Dept. of Agriculture)	mainly commodity	In recent years their 3,200 tariffs have received 300 tariff changes a day.

egotiated changes in the classification of an item. Further, roposals for changes in rates or tariffs are bound to affect owerful forces in the transportation industry. Innovations must e politically as well as economically feasible if they are to be idely used in the industry.

Efforts at coping with and improving the current situation e discussed in the next section but they should be seen as erating in a general rate environment which is somewhat resist- t to change. Tariff simplification and standardization will nerate this type of support only if they are of value to individ- l firms. Although theoretical arguments about their advantages ll not insure their usage, such discussion is helpful in charting e course to follow in the future.

3. CURRENT SOLUTIONS TO THE RATING PROBLEM

3.1 THE SYSTEMS ASPECT OF THE PROBLEM

Any solution to the rating problem must satisfy two sets of criteria for the firm. First, it must be a valid technical approach to the rating problem itself; i.e., it must provide the proper legal rate and must be technically and economically feasible. Second, the solution must coordinate with the other internal processes in the firm. There have been computer systems which satisfied the first criterion but not the second, because of data transmission problems or failure to deliver the information to the right place on time. Although computer oriented systems are emphasized in this report (for certain classes of users), it is not suggested that any firm can solve its rating problem by grafting a computerized rating (CR) system onto its current operating system. As an example, a shipper will integrate its rating/payment/audit function with its accounting and physical distribution systems for overall optimal efficiency. This report will often deal with the narrower technical problem (the rating problem) but the reader should keep the overall setting of this one function in proper perspective.

There are two main schools of thought on how the rating problem itself can best be handled. These are exemplified by a conversation between a carrier executive and a computer expert in the transportation industry. The executive stated, "We cannot work with the existing tariffs. Standardization and simplification must come first, then computerization may not even be necessary." The computer expert replied, "I haven't seen any signs of progress in those areas worth mentioning. You'd better computerize soon or yo won't be able to handle the mess."

3.2 MORE ELEMENTARY SOLUTIONS

Before one gets to the level of rate computerization or simplification, there are responses to the rating problem which do not involve hardware changes at all but rather managerial improvements in the processing of shipment information. An example would

be the publication of the standard commodity descriptions within a company for items shipped frequently. This publication may be as a listing for shipping clerks or as a series of pre-printed bills of lading (B/L's). Another technique, which is popular among carriers, might be called semi-automated. Here the rating of freight bills is centralized by transmitting the rating information over a CRT network, having an experienced rateman rate the shipment, and transmitting the result back to the loading dock.

At another level there are approaches which use hardware applications. Microfilm applications involve the replication of tariffs, tariff information, or specific rates on sets of microfiches. This technique is used by several hundred companies, although the specific application may vary. Rocky Mountain Motor Tariff Bureau has been very aggressive in this application, claiming more than 150 customers. The main advantage seems to be the smaller storage space required for tariffs. However, the information is still carried in its present form and there is no serious improvement in the overall rating methods. Microfilming does not attack the indexing and maintenance problems resulting from the tariff structure, which hamper the storage of rates in a computer.

The publication of tariffs by computer does not directly further the rating process, either, although it does offer definite cost advantages over the normal publication methods. The computerization of rail tariffs, in particular, demonstrates the difficulties of adjusting current tariff information to facilitate technological improvements. The Joint Railroad Tariff Computerization Committee (JRTCC) worked on the problem of computerizing the publication of existing rail tariffs from 1966-1971. This work led to the successful filing of a test tariff in 1970 and the subsequent conversion of many rail tariffs to computerized publication. The JRTCC recommended a method of computerized rate retrieval which has become known as RepRate, the most promising advance in rail rate processing to date.

These steps were not achieved without resistance. The computer-printed tariffs were criticized for illegibility and for

difficulty in usage by ratemen. The first point was quite valid and was answered by the use of a new typeface. The second point seemed to reflect a reluctance by some ratemen who were used to the existing system and wanted no changes, good or bad. The JRTCC had formatted some of the information in tariffs to ease their revision and to pave the way for the storage of tariffs in computers; some ratemen felt that this made the tariffs worse. This is still a sore point between different factions in the rate complex.

Both microfilm applications and computerized publication are of modest value in themselves. However, they demonstrate that any requirement for handling tariffs precisely and mechanically reveals the cumbersome nature of the current tariffs and puts pressure on the rate-makers and publishers to improve them.

3.3 COMPUTERIZED RATING (CR) SYSTEMS IN DOMESTIC SURFACE FREIGHT

Contacts were made with representatives of many of the existing CR systems in the U.S., as well as defunct ones and those still being constructed (our definition of a CR system was one in which rates are stored and retrieved by computer. Here we will also include systems which border on this). A resume of these discussions appears in Appendix A-1. The present section describes the major aspects of the current generation of CR systems.

3.3.1 Basic Elements

Although these systems differ considerably from each other, there are basic elements necessary to any such endeavor. A CR system has to contain the pieces of rating information, the means to access these for rating, and the means to update them. Examples of these elements are the following:

RATING INFORMATION[10]

rate tables (class rates, commodity, exception)
notes
routes
codes (commodity, location, maybe carrier or vendor)

MEANS OF ACCESS

printed output (ponies)
terminals with direct entry to files
terminals with access to rateman
batch processing of F/B's

RATE UPDATE

substitution of new tariff "page" for old
tariff changes coded by rateman
specific rate changed, if necessary.

Also of importance but more difficult to classify is the linkage of a CR system with a firm's Management Information System (MIS). Because the uses of information vary so much from firm to firm it is simply indicated that the CR system is involved in a MIS system. This includes the functions of traffic analysis, distribution analysis, order entry control, shipment tracing and others.

The manner in which rate information is stored is a critical decision by the designers of the system. This choice implies the type of indexing that will be used for retrieval and update and the manner in which the tariff information will be structured for data entry purposes. Therefore, one can tell what "kind" of CR system it is by knowing how it stores the rates. In practice no system is purely one type or the other.

3.3.2 Taxonomy of CR Systems

At one end of the spectrum is the "stored-rate" approach, basically a pony system. It is the most widely used method of coping with the demand for rating. The rates in storage are only those which have moved traffic. These systems handle stable commodity rates and repetitive movements well; retail-type traffic patterns are a problem. Stored-rate systems tend to be somewhat less concerned with standard codes (since they don't operate from a tariff format) and with being able to rate every F/B that passes through the system. Manual inputs are often mixed with the

computer operations - e.g., the daily preparation of rate changes in the pony, prepared by experienced rate analysts.

At the other end of the spectrum are "generative" CR systems. These feature the storage of enough tariff information and sufficient logic to actually "find" a correct rate and build the freight charge in the computer. In its ideal form this type of system would replicate the rate search as a rateman would perform it. Although there were many generative systems proposed in the period of the early 1970's, only a few were successfully cut over. These systems store the data in a form akin to its representation in the tariffs, have near-complete rating of all F/B's on the computer, and handle a more diverse traffic mix than stored-rate systems. This approach is preferable for a service organization having many clients.

The stored-rate systems vastly outnumber the generative ones at present and this trend seems to be continuing among the developing systems. CR systems having a broad coverage - all rates for all carriers in a region, for example - do not exist yet. This appears to be a problem of operating costs and marketing rather than technical feasibility.

A very important aspect of CR systems is that they are easily linked to Management Information Systems at many levels. Computerization of the rating step makes available the shipment information in a form that is suitable for statistical analyses. Several users claimed that the best selling point with management was improvement in traffic analysis or rate analysis rather than the lower cost of rating a F/B.[11] Also, rating may be combined with other functions in a CR system. Rating/billing is a natural combination of functions for carriers; rating/auditing for shippers. The rating function has been extended to prepayment agreements for some shippers.

3.3.3 Generalizations on the Current CR Systems

Over 50 CR users were identified. While the exact total is hard to determine since service firms cannot freely reveal the

.ames of their clients and companies developing their own systems .end to be somewhat secretive at first, this number is still large :nough to suggest that the first generation of operational CR ;ystems has arrived.

On the basis of our initial survey, the following generaliza- :ions are suggested, pending further research.

a. Shippers are entering CR applications fairly rapidly, especially those with a large annual freight bill. Service firms ıave successfully entered this market for large and medium sized :irms but it is debatable whether small shippers can economically lo CR yet.[12] Firms have successfully used both the stored rate ınd generative approaches. The choice of technique seems to vary vith a company's shipment type. Shipments taking commodity rates :an be handled better by ponies. Shipments taking class rates ınd nationwide traffic may require a generative method.

b. Some railroads are entering CR using the Reprate technique. This is a pony containing waybill information on repetitive move- ments. Rail carriers are satisfied if they can rate 70-80 percent of the F/B's by CR, since this allows enormous savings in time, accuracy, and overage claims. Around a dozen carriers hope to ıave an operational CR system by 1976.

c. The motor freight industry has certain characteristics vhich have retarded the expansion of CR. There are relatively few large firms; therefore, relatively few who can afford CR. The ɔulk of motor freight traffic is LTL (Less than Truck Load) and ıot highly repetitive. Finally, although easier (class) rates ɔrevail, the actual freight costs often involve accessorial charges ɔr other special charges, making computation of the freight charge complex. Consequently, very few CR systems have been successful in trucking firms. Service firms have recently entered this market on a regional basis.

d. The firms using CR systems appear to be much more inter- ested in tariff standardization and simplification because they face the problem of indexing a rate in a unique manner for retrieval and updating. Although there is no overwhelming consensus among CR

users to support standard codes, support there is better than in the industry overall.

e. There are factors other than size of firm, mode (for carriers), or type of shipments (for shippers) which encourage the development of CR systems. One example is that large shippers already engaged in advanced logistics systems find the manual rating step a hindrance and support the CR effort.

f. Several groups have initiated discussions concerning shipper-carrier linkage systems. These would capture information at order entry and run through the rating/billing/payment steps.

3.4 RATE AND TARIFF SIMPLIFICATION

While rate computerization emphasizes technical improvement in the processing of rates, rate simplification involves changes in the rates and tariffs themselves. This report will use the term rate simplification to cover both rates and tariffs. Such efforts have been directed in the development of simpler rates (usually scales) where possible, making the computation of the rate easier and the revision of tariff formats and publication requirements to allow better ordering and indexing of the data items in the tariffs.

3.4.1 Rate Structure Simplification

One approach to rate simplification is formula rates. Such researchers as Whitten, Wharton, Johnston, and D'Anna have recognized that many of the present rates are based on scales (simple distance-price relationships) but that these scales have been distorted during general rate increases by rounding and by occasional errors.[13] Therefore, sets of rates with underlying mathematical relationships become sets of unrelated prices.

The formula rate researchers also try to determine how much each of the current (tariff) rates deviates from the basic formula. The results to date, both published and unpublished, show a very good fit. The next point to determine is which rates are amenable to this treatment, i.e., have minimal distortion, and what is the least painful way to re-establish the true scales. Since the

existing rates do contain some distortion in their published prices, readjustment to a "true" scale would involve small changes in these prices, on the order of 1 or 2 cents for the best cases.

This approach could be of significance in CR development. As noted above, scales do underly many of the existing rates, although there are many different scales. The potential is here for condensing many class rate pages into a few base numbers and a mathematical expression. This would reduce storage requirements, enhance proper computation, and ease tariff maintenance.

3.4.2 Tariff Format Simplification

This leads to another approach to tariff simplification: accept the prices as they appear in a new tariff but try to handle the changes to the tariff so that they do not unduly complicate the rate search. One bureau, the Middle Atlantic Conference (Motor), has published a scale rate tariff which it will try to maintain as a true scale through tariff changes. The Southern Freight Conference (Rail) is trying a similar approach in a tariff on a particular commodity; they will try to maintain the scales accurately throughout tariff changes.

Edward Kreyling has suggested an even broader approach. He proposes that even if the original set of rates doesn't fit an underlying mathematical relationship, it is useful to maintain the set as a "scale" (here meaning a table of fixed numbers) and to apply successive rate changes as tables of factors, preserving the original "scale." The original relationships could be altered but only by specifically writing this into a rate change. This idea would combine pricing flexibility with the ability to store rate tables in a more logical manner.

Another example of rate simplification is FAK rates and unit train rates. These apply a simple classification to the total shipment and a simple mileage/price relationship for determining the basic rate. They are, indeed, a model for the industry in those situations where it is feasible to apply them. However, their growth has been slow in the private sector. The reasons for

this are discussed in Appendix A-1 under Government Shippers.

Still another approach would be to purge the tariffs of "unused" rates. In 1970 Alan Boyd suggested the purge of rates which had not moved traffic in the last three years. This was generally well received by transportation officials with the qualifications that carriers and shippers still might want to retain some of those rates. Even rates which do not move traffic may serve a purpose, such as establishing a negotiating point for price bargaining. A recent proposal by Dale Furnas appears to answer this criticism (see Appendix A-3) and is worth consideration by shippers, carriers, and regulatory agencies. This is a straightforward proposal which might alleviate the tariff maintenance problems of both CR and manual systems, but its true value will not be known unless it reaches the implementation stage.

Finally, the most aggressive and far-reaching research in formula rates is the attempt to develop scale rates based on the actual costs of the shipment to the carrier. While this work has not gone beyond the research stage in the U.S., the French rail system has already implemented rates of this type.[14]

3.5 OTHER ASPECTS OF THE PROBLEM

3.5.1 Ocean Carriers

Ocean carriers also face a rating problem due to the tariffs they have created. These tariffs tend to be individualistic, with no consistency in codes and commodity descriptions. The disparity between commodity descriptions on inbound and outbound shipments, for example, has long been a sore point between the trading nations. Standardization apparently must precede any other systems improvments in information processing. To foster this, pending legislation requires the FMC to engage in tariff simplification, starting

with commodity codes. There is also a joint effort between DOT and FMC aimed at standardization of the major shipping forms.

Within the tariffs limited use is made of SITC[15] codes. Individual carriers have progressed as far as the transmission of bill of lading information and the development of an automated billing and payment system.

3.5.2 Air Freight Carriers

Air freight rates are basically simpler than surface transport rates. Because the rates are point-to-point and there are a limited number of commercial airports, the totality of domestic freight rates is fairly small. Efforts are being made to standardize the commodity codes; most carriers now use the Brussels nomenclature.[16] Since practically all of the domestic freight rates are published by the Airline Tariff Publishers, simplification and standardization are easier to achieve. The Civil Aeronautics Board (CAB) is moving ahead on two aspects of tariff simplification; formula rates and simplified tariff formats. Individual airlines themselves have recently begun to develop CR systems for freight. American, Flying Tiger, Eastern and United all have projects underway in this area.

3.5.3 Non-Computerized Carriers

The brevity of the survey period limited the number of interviews and biased the sample toward the "activists" in the industry. It is worthwhile, therefore, to summarize the comments of several motor carrier firms and bureaus who have chosen not to computerize.

For the large carriers handling a diverse traffic mix, rating is admittedly a problem. They cope with it but that is all. It does not appear economically feasible for most carriers to computerize their rates at present. The two main influences on the cost of rating, volume of shipments and size of rate file, seem to cancel each other out. A firm must have a large volume of shipments before CR would be economical. However, as the volume of traffic grows, the size of the rate file is apt to grow also,

increasing the cost of CR. If bureaus or other agencies offered CR services carriers might buy it depending on prices. Most large carriers are avoiding CR by centralizing their rating function with CRT (display tubes) transmission.

Small motor carriers appeared to be outside of the present market for CR. The small carrier's processing of shipment information, accounts receivable, and traffic analysis are usually done at a level well below that requiring automation. The investment in CR would be beyond their means and the gain from it minimal.

3.5.4 Small Shipments

It was emphasized at the start that the rating problem would impact various firms in the transportation industry quite differently. One way of categorizing these firms would be by the type of shipments they process. Small shipments, for example, are a distinctive shipment type.

This traffic has been priced out of the reach of rail common carriers and is causing problems with motor carriers. A recent study[17] supported the contention that the costs of the shipping services exceed allowable rates in many cases. "Overhead and paperwork costs represent a very high proportion of the small shipment total expenses, and they vary almost entirely with number of shipments and not weight."[18]

The report went on to suggest new organizations and systems techniques which might ease the problem. The possibility of a common computer system for rating, waybilling, billing, collecting, labelling, tracing, claims, and inter-company settlements is mentioned. While this is just a proposal it is still significant that improvement of the rating process and the other document processing is recognized as a key factor in the reduction of costs.

4. POLICY IMPLICATIONS

After reviewing all of the current efforts, there are several observations which can be made concerning the relationships between the standardization, simplification and computerization of tariffs. First, none of these three is absolutely necessary for the achievement of the other two, although all of them complement each other to some degree. Second, while there is an excellent case for standardization and simplification at the industry level, there is relatively little (economic) reason for individual firms to do either. Finally, following the second point, it is extremely important to differentiate between activities at a multi-firm level and at an individual firm level in evaluating solutions to the rating problem.

As an example, let us view standardization efforts. Many people define "standardization" to mean use of commonly defined items at an industry level. However, standardization can be achieved within individual firms through the use of pre-printed commodity descriptions on the bills of lading, through centralization of the rating function, etc. At the industry level, standardization is being attempted via standard codes and documents. However, these attempts encounter the same resistance that faces any proposal for changes in tariffs. While very few interviewees argued against the concept of standard codes, (there were some dissenters) most were cautious about actually using the codes. Some expressed doubt that it was worthwhile to convert to standard codes before more work is done in the area. Some had even constructed translation tables between STCC and their internal commodity codes but were not using them yet. We received the impression that these codes will not be used for the sake of being progressive nor will they in themselves lead to advanced rating methods. Instead, the codes and other forms of standardization will be accepted and used when there is a practical need for them. One particular item may bring about such a need.

Advances in computerized rating systems will create a demand for standardization. This will be particularly true when the systems begin to communicate with one another. Considering the discussions that are now occurring, the next level of computer system - linking many shippers and many carriers - is not far off.

All of the available evidence--interviews, articles, conference proceedings--shows that the users of CR systems are more sensitized to the problems inherent in the existing tariffs. While all rate rooms use similar tariffs, those firms which have computerized their operations are faced with the additional problem of using rates and updating rates automatically. These systems are less able to use the shortcuts and temporizing that a manual approach allows; inter-communicating they will generate pressure for data standardization. Because the CR systems are forced to survive within the pressures of the transportation industry, the improvements they generate will be technically and economically feasible. While the rate of progress in this evolutionary approach to tariff standardization-simplification-computerization may be slower than some hope for, the gains will be ones which have been tested and approved by the users themselves.

The implementation of CR systems is to be encouraged for these reasons, but the decision by any one firm to computerize or not should remain an individual one. Any DOT proposals here must be flexible enough to assist innovative efforts without penalizing those companies who find it uneconomical to computerize. Shippers and carriers acting in their self-interest, within the bounds of national transportation policy, will generally develop efficient and reliable methods of operation. In the existing CR systems these individual needs have been met--at a price--and the companies are able to cope with their rating problems. In fact, the current generation of CR systems appears more viable economically because they have been tailored to their operating environments.

The next phase in computerization will involve exchange of information between companies. In such a linked arrangement--perhaps 'conference' is the most descriptive word--the freedom of

data standards permitted individual firms must be modified. If two companies exchange information through their computers, obviously there must be agreement of data standards, including codes and record formats.

Such standards might be developed conference-by-conference, in an eclectic manner. This would mean that firms belonging to several conferences would be forced to maintain several sets of translation tables; it would also impede eventual communication between conferences. It is more reasonable to encourage the use of standard codes and data formats in all of these multi-user systems.

Will such codes and formats be available for users? Among other results, DOT and the National Committee on International Trade Documentation have developed a U.S. Standard Master for International Trade from European prototypes. The American Association of Railroads is developing the Standard Transportation Commodity Code (STCC), the National Motor Freight Traffic Association is doing the Standard Point Location Code (SPLC) and Standard Carrier Alpha Code (SCAC), and the Dun & Bradstreet identifier is a patron code (DUNS). The Transportation Data Coordinating Committee has been greatly responsible for fostering the use of these codes.[19]

At present these codes are used internally but not inter-firm. Among CR users, there is some degree of usage but in an augmented form, i.e., by adding information to the basic code items. STCC was used the most; SPLC was the most problematic. While many firms in transportation recognize the need for industry-wide control of data standards, it is a matter of individual decision and costs at present. Furthermore, the proper level of control seems unresolved. As an illustration, try to imagine a general commodity code which would be sensitive enough to capture the product delineations of every shipper and the pricing require-ments of every carrier. The code would be lacking structure if it were that extensive. This does not negate the usefulness of a standard commodity code; it shows that such a code will invariably

be modified by some users for their internal processing.

The critical question is how much variability[20] can be allowed in the code. TDCC has responded to this problem by emphasizing the development of a list of commodity descriptions (a thesaurus) which would permit entry into all of the major commodity codes. Also, they have permitted the use of suffixes in order to capture finer gradations than their basic generic item allows. There is still work to be done on the cost of implementing these codes.

Another result of the piecemeal development of CR systems is that must users have had to pay the entire cost for creation and maintenance. These projects typically cost from $500,000 to over $1,000,000 for a large company with many tariffs. If this cost could be reduced or shared and if prospective users were guaranteed reliable updating of the rate files, the number of CR sites would increase greatly.

One way to accomplish both goals is to build rate files jointly, where possible, and to maintain them as a central data base. These data bases would include rates, routes, carriers, shippers, notes, special charges, etc. These files would be broader in scope than the existing ones, possibly regional and multimodal, and they would offer access to many different users. Such rate utilities would offer cost sharing plus greater reliability. The costs referred to involve file creation and maintenance.

Two final points should be discussed. First, there was some reluctance concerning standard codes because this might hurt the pricing techniques of shippers or carriers. This is based on the feeling that the use of standard codes such as STCC would impair one's ability to negotiate favorable rates since commodity classifications are sometimes adjusted to allow a change in the pricing of a particular movement. This problem should be recognized for what it is - a classification problem. The development and maintainence of a standard set of commodity names would not impede such activity. The classification committee would be the decision-maker here, not the code committee.

Second, there was concern over 'sharing' information in a data base or a rating/billing/payment system. DOT is well aware of the sensitivity of some of this information to the firm. We believe that adequate security methods have been developed for multiuser computer networks to guarantee security of the information. Naturally, the development of these projects would require careful discussion of which data is shared in the system.

5. PROGRAM RECOMMENDATIONS

5.1 THE NEED FOR EDUCATION

The capability of improving rating processes through procedural refinements and the application of computer technology seems undeniable. The desirability of fostering such improvements has been indicated in this report. What is not readily apparent is the economics of such applications. Since no shipper or carrier will pay inordinate amounts for improvement in their rate handling, they need to know how much current rating methods cost and how much the new methods will cost. Only with such information can rational decisions be made as to CR feasibility.

One type of activity that DOT could perform, then, is education. The word is used here in a broad sense, including both the acquisiton and dissemination of knowledge. This could include surveys, theoretical analyses, feasibility studies, publications and seminars. The experience gained in this study suggests that very few people have a general knowledge of what is occurring in rate simplification and computerization. Some executives may be deciding against new techniques because they don't know enough about them. DOT could help with the dissemination of this information.

An area ripe for the exchange of ideas is formula rates. There are a small number of talented people doing independent research in this area, but their results are often lost to the general transportation public. DOT could begin its long-run rate research by surveying the work to date, seeing if general mathematical models are applicable, examining which rates are amenable to this method, what the returns would be to the industry and encouraging implementation efforts. The value of widespread publication cannot be overemphasized. The formula rates are one possibility for the future direction of freight rates in the U.S. These ideas should be studied carefully and discussed throughout the industry.

.2 THE NEED FOR RESEARCH

An interesting aspect of the literature reviewed was the bvious influence of a small number of academic efforts, such as he 1966 Battelle study, the 1968 Texas Transportation Institute tudy, the Transportation Research Forum meetings (particularly he Ohio Chapter), and the University of Wisconsin seminars. onsidering the quality of the work, it is unfortunate that the ist is so short. Universities in general have been slow to igage in rate research. Certainly the importance of technical nprovements in transportation and of policies supporting these ıould call for more involvement. It may be true that the applica- ion of theory to real-world transportation problems is often .fficult - this argues all the more for the academic sector to ıare the burden with the practitioners. DOT should stimulate more : this activity by sponsoring cooperative seminars and research ·ojects.

The next level of activity required by the evolving CR systems lates to the development and maintenance of data standards and ta bases. This means that another type of activity, a librarian le, must be performed by some group of institutions in the dustry. Before this can be achieved, there are two research sks DOT must perform.

The first is the determination of the proper level of varia- lity for standard codes. This problem should be studied with spect to the structures of the codes, the usage in operational stems, and the expected uses in information exchange systems.

The other research task would be to examine the economics of nputerized rating applications. The costs of rating manually, CR, and within a network of rate utilities would be estimated d the demand for the newer methods would be projected. Very w studies relevant to these costs have been published; most of em are out-of-date. TSC was unable to get this type of informa- on from the interviewees, as was mentioned earlier.

Because a knowledge of the current "transaction cost" is so portant in assessing the potential worth of CR projects or rate

"utilities", and because this information is apparently highly confidential, we suggest that the representative groups - NITL, AAR, ATA, etc. - conduct their own confidential surveys. The precise form of the surveys should be determined cooperatively between DOT and each organization. The desired information would include the average cost of rating a freight bill and how this cost varied with items such as:

size of the firm,
volume of traffic,
type of shipments,
type of rates,
rating method,
size of rate file.

It would also be useful to know:

error rate on rated freight bills,

amount of overcharges or undercharges available to the firm (as a percentage of gross freight payments/revenues),

number of tariff changes last year,

management reports connected with transportation.

Proper safeguards can be attached to ensure the confidentiali of the material. This survey seems a necessary and reasonable ste if we are to progress from qualitative to quantitative work. It i the only way to estimate the costs and demands associated with suc projects as the rate "utilities" or with linkage systems.

Many government departments and agencies, such as DOD, GSA, GAO, ICC, USDA, TVA, and DOT, have done important work in tariff simplification or computerization. Because these efforts are not coordinated, any gains to the overall freight industry are diluted DOT should draw attention to these efforts and act as a coordinati agency where it is proper. This is especially true on the large C systems being planned by several of the organizations mentioned ab

The final level of activity which DOT could undertake is prototype development. The transportation industry is not the aerospace or computer industry; a relatively small part of profits

re reinvested in long-run research and development. If chosen isely, a modest investment of resources by DOT into innovative rograms may produce a high return in terms of technical improve- ent in the industry. DOT has personnel experienced in data pro- essing and systems design, as the previous CARDIS demonstration roved. The Center's skilled analysts could be used in coopera- ion with either another government agency or with a group of rivate shippers and carriers. The development of a rating/bill- ıg/payment prototype, for example, would demonstrate to the ıdustry that many users could be linked successfully.

3 SUMMARY OF RECOMMENDATIONS

DOT should encourage the development of individual and group systems because they represent improved data handling in trans- rtation, they sharpen the companies' awareness of the diffi- lties in processing rates and tariffs, and (therefore) they will nerate pressure for better tariffs and rates. As a first step T should analyze the costs of rating for many firms. Since the oblems seem essentially different in the air and ocean freight ctors, DOT should focus this project on the surface transporta- on of freight. DOT should also sponsor research which takes the nger view, such as the formula rate analysis.

Specifically, DOT should perform the following tasks:

commendation 1: Encourage the purging of unused rates from freight rate tariffs.

The use of tariffs at present is complicated by their rmat and logic, as well as the sheer volume of material. is latter aspect can be reduced by eliminating useless terial from the tariffs. It is the belief of the author at the Furnas Proposal (Appendix A-3) offers a reasonable thod to eliminate such material. DOT should publicize this oposal and encourage interested shippers and carriers in the velopment of a test case. The ICC in the past has shown

that it is willing to help in such efforts, provided there is a clear request for the activity from shipper and carrier groups.

Recommendation 2. Determine the economic potential for carriers and shippers of using simpler (mathematical) expressions for rates in tariffs.

Previous studies have indicated that many of the current freight tariffs are based on price-distance scales. Furthermore, the series of individual rates in these tariffs can be closely approximated by simple quadratic expressions. This raises the question of whether some of the present tariffs could be replaced by these mathematical expressions, allowing the tariff to be stored in a much smaller space. This approach might also allow much more convenient computation of the freight charge than the current tariffs. To explore this method further, three aspects of the problem should be considered:

a. Determine the technical feasibility by finding out whic tariffs would be amenable to this approach and how closely the formula rates matched the existing rates.

b. Determine the economic feasibility by analyzing the savings in storage, retrieval, computation costs for both computerized and non-computerized rating.

c. Approximate the market potential by determining what would be required to publish and use such tariffs. This would include the identification of specific areas of resistance to such tariffs.

Recommendation 3. Encourage the use of standard codes and data formats where practical.

In order to attain the most efficient processing of tariff in the future, common terms, codes, and other tariff elements ar needed. Therefore, the following actions are needed:

a. Determine the costs and benefits of using standard codes by computerized and non-computerized rating systems.

b. Continue to support the shipper and carrier organizations, as well as the regulatory agencies, in their development of nationally and internationally accepted codes.

c. Assess the possibility of developing standardized and coded general rules, principles, and factors that affect freight charges.

d. Determine the best institutional arrangement for maintaining the standard codes. This would include the funding, the organizational structure, the technical method, and the desired level of public/private participation.

e. Determine if each tariff improvement item is considered detrimental by elements in the ratemaking complex. If so, devise an alternative method to achieve the same goals.

Recommendation 4. Conduct feasibility studies within the rail and motor freight industries to determine the technical requirements and the market potential of rate "utilities" or shipper-carrier networks.

The next step in computerized rating, that of multi-user systems, offers many opportunities for standardization and simplification of tariff information. If the basic logic and operating characteristics of such systems can be clarified, then the Department of Transportation may be able to convince private firms that it is in their best interest to accept some degree of standardization and simplification at this stage of development. The Office of Facilitation should fulfill its role as catalyst in the transportation industry by accomplishing the following tasks:

a. Determine the true transactions cost for many shippers, carriers, service agencies, and others who perform the rating function. This would be done by means of a confidential survey conducted by the shippers and carriers themselves. The results would reflect how the cost varied with each firms's characteristics. The survey would include computerized and non-computerized rating methods among firms of all sizes and types.

b. Survey and describe the development of multi-user, computerized rating/billing/payment systems. This would include systems offered (or proposed by service agencies and rate bureaus as well as shipper-carrier arrangements.) This research should itemize the information required of each user, the costs and returns to them, and the standardization requirements in each system.

Recommendation 5 Coordinate the Department of Transportation's Tariff Simplification Project with related efforts by other Federal groups, such as the General Accounting Office, the Department of Defense, the General Services Administration, the Department of Agriculture, and the Tennessee Valley Authority.

Many government agencies are now involved in tariff simplification and computerization projects. While it must be admitted that there are some differences between public and private rate processing, it has been the case that governmental efforts have been the forerunners of private ones in some areas of rating. Within the many active government projects, DOT should exchange information as freely as possible to avoid duplication of effort and to make results available to the public

a. Develop a central library containing all available material on tariff computerization/standardization/simplification at the Transportation Systems Center. Copies of reports dealing with government rate projects would be obtained for this library as they appeared. The materials would be available to all interested parties.

b. Invite government agencies doing tariff research to discuss their work before public and private rate experts at DOT sponsored meetings.

c. Encourage the continued participation of the regulatory agencies (Civil Aeronautics Board, Interstate Commerce Commission, Federal Maritime Commission) in tariff simplificatic

Recommendation 6. Encourage academic involvement in computerization, simplification, and standardization efforts.

The academic community possesses a wide range of talents which could be brought to bear on the rating problem, yet it has done virtually nothing in this area. This lack of response seems due to the failure of the public and private elements in the freight rate complex to properly publicize the problem. The importance and excitement of the rating problem have not been transmitted to the universities of America. To correct this situation, the following steps are recommended:

a. Inform the university department of transportation about DOT tariff projects and provide guest speakers to academic conferences, if requested.

b. Invite academic representatives to participate in DOT meetings.

c. Fund research on tariff computerization, simplification, and standardization in university departments of transportation, business, economics, computer science, and information science.

d. Collect any relevant academic reports for the proposed Tariff Research Library at the Transportation Systems Center.

Recommendation 7. Conduct a series of seminars to disseminate information and encourage discussion on specific topics within tariff computerization, simplification, and standardization.

The field of freight transportation is broad and very few people working in it keep up with developments outside of their own area of specialization. During the interviews leading to this report, there were numerous times when innovative work was being done by the group but the existence of this work was unknown to others. The demonstration of new ideas and achievements should act as a spur to other members of the rate community.

These seminars would be intended as the third stage of the tariff work, following this survey and the proposed research efforts.

NOTES

[1] Even if it were demonstrated that the present rates and tariffs are difficult and costly to use, the fact remains that they are being used. There is a valid question, "Why are tariffs (and rates) in their present condition?" This question must be dealt with eventually but is beyond the scope of this report.

[2] The reader may gain a feeling for the optimism of the period by reading the Proceedings of the Transportation Research Forum - Ohio Chapter, the University of Wisconsin Rate Seminars, or the Transportation Data Coordinating Committee Annual Meetings.

[3] See the Texas Transportation Institute study.

[4] The rating problem refers to the difficulty in finding the correct rating or building the correct freight charge, with the accompanying costs for this failure.

[5] Herbert Whitten, The Railroad and Motor Carrier Freight Rate Complex, p. 6.

[6] Joint Railroad Tariff Computerization Committee report.

[7] For the reader unfamiliar with tariffs here are some brief explanations. The long and short haul clause states that a common carrier shall not charge more for transporting goods between two points than he charges to transport similar goods to a further point along the same route. The aggregate-of-intermediates rule states that the legal rate for a shipment may be a through rate or the sum of the intermediate rates, whichever is lower. Both of these rules were established to combat discriminatory practices. In the current rating environment they are sometimes employed in extremely clever fashion to produce a lower rate than one's competitor has. This is done by piecing together an alternative combination of moves which would sum up to less than the stated rate. There are ratemen who are

expert in this technique for various regions of the country. Transit rules are a means of giving an intermediate point on a route the same storage or processing rights as are available at either the origin or destination. Transit rules can have different applications. One type states that goods coming into location X and going on to location Y, perhaps after a delay, can receive a more preferable rate from X to Y than goods simply shipped from X to Y. Besides the problem of applying information retroactively, there is sometimes a problem in verifying that the commodities referred to in several tariffs match up. Another application of transit would be in a shipment of grain from Minnesota to Memphis, where it is stored temporarily and finally shipped to New Orleans for export. The shipper can claim through-rates from Minnesota to New Orleans and also credit from the payment for the first movement. Interline movements are very common and often simply share the freight revenue based on some formula reflecting terminal costs and line haul. However, if there are three or more carriers and if special handling is required during the movement, the apportionment of revenue can be tricky.

[8] Whitten, The Impact of Rail Ex Parte Rate Increases.

[9] Ernest Olson (ICC), personal letter to Robert E. Muldron (DOT), dated March 29, 1974.

[10] These items of information could be collapsed into a rate predetermined by the ratemen which would be stored in the computer.

[11] See "EDP & PD: How the Professions Communicate," Traffic Management, August 1973. This point was also mentioned by at least six of the interviewees.

[12] One service firm supplying CR services for shippers gave the following rough criteria for the lower bound of their potential market. They generally found that firms having under 1 million dollars in annual freight payments, or under 1,500 F/B's per month, or under twenty million dollars total sales, were not interested in CR.

[13]Whitten, Impact of Rail Ex Parte Increases.

[14]Herbert Whitten has examined a marginal cost rate structure based on the relationship

$$R = k\, e^{-n/40} \left(T_o + T_d\right) + M\left(1 - D\left\{M/100\right\}\right)$$

where R is the rate in cents per hundredweight, k is the basic cost associated with the mode, e is the mathematical base e, n is equivalent to the classification of the good, T_o is the originating terminal cost, T_d is the destination terminal cost, M is distance, and D is a percentage discount for distance. A group led by Joseph Goldman at GAO is working on a cost-based rate also. Their first report is expected by September 1975.

[15]Standard International Trade Classification. This is the United Nations' classification of commodities moving in international trade. It derives its nomenclature from the BTN (see below) and is correlated with it by number.

[16]Brussels Tariff Nomenclature. The commodity code used by the European Common Market. It is the standard for international trade.

[17]See Small Shipments: A Matter of National Concern.

[18]Ibid, p.95.

[19]See Appendix A-2 for a brief statement on the status of domestic standard codes.

[20]This term was suggested by Anthoney D'Anna.

APPENDIX A-1. CHARACTERISTICS OF CR SYSTEMS

Representatives of many CR systems were interviewed. Some firms were missed due to time limitations or because they were using the same system as another company. The following section summarizes the main characteristics of each system.

SHIPPERS (PRIVATE)

The firms contacted were Dupont, Western Electric, Phillips Petroleum, Johnson & Johnson and Goodyear.

Dupont is a large firm with a heavy shipping volume and diversity in its shipments. Since each department is somewhat different, the traffic reflects bulk, TL and LTL. Dupont is presently using a computer-printed pony. They calculate and prepay freight charges to some degree. This is reported to have increased the accuracy of the freight charges, thereby reducing the wasteful claims procedure, and to have enhanced the MIS capabilities. The current pony is part of their Integrated Freight Payment System which handles 60-70 percent of the freight dollars and 40 percent of freight shipments. Internal codes are presently used. Dupont is converting a portion of their traffic to a pure CR system (DSI) and expects this to be operational in 1975.

Western Electric is implementing an advanced pony system. W.E. plants are at various stages of using CR systems. The W.E. traffic reflects high volume, many products and many destinations for both inbound and outbound shipments. Their rate files include numerous class rate tariffs plus selected commodity rates chosen by the plants themselves. The most advanced W.E. plants do pre and post-audits, paying on their own figure. This has improved the accuracy of the freight charge enormously, as most carriers admit. The most important logistical function of the W.E. system is its listing of modal choices for each shipment in a computer-printed pony. By referencing the mode, origin and destination, commodity description, and weight, a shipping clerk can evaluate the modal

choices for a plant in terms of price and transit time. It should be noted that a good deal is built into this listing. For example, carriers considered unreliable are simply left off the pony. W.E. uses standard codes in an augmented form. Inbound traffic causes some problems with nonstandard codes, faulty B/L's, etc. W.E. negotiates for the use of standard data by their suppliers to overcome this.

Phillips Petroleum has a sophisticated Real Time rating system that is unique in its provision for historical, current, and future rates. The rate maintenance capacity is unusual. Rate updates in the hundreds of thousands can be and are made in a single day. Because of the way the tariff information is handled in the file creation, tariff updates are done quickly with a few lines of coding. During the first ten months of 1974 the Phillips' PEACH system (a successor to their PEARL) handled over 3,000,000 rate and route changes with seven employees at an annual labor cost of $73,000. To handle these changes with a traditional line-for-line computerized system would have required 93 employees at an annual cost of over $900,000 for labor. Though Phillips' shipments are generally large and take commodity rates, PEACH is not restricted to that kind of shipments and rates.

Johnson & Johnson represents a class of shippers who have a high volume of small (avg wt = 850 lbs) shipments. They have a relatively small number of commodities (60-70), plants, distribution centers and carriers. Their rate files are keyed on the customer. These files were simplified by J & J's efforts at consolidating their products into a small number of categories within the actual tariff classifications. They rate and pay based on their own figures; they report a great improvement in the freight charge accuracy - the carrier benefits by faster payment. They are able to maintain rates from about 100 tariffs with just four clerks even though their rates are almost all commodity rates. The system took 2-3 years to develop; J & J had no previous computer expertise in this area.

Goodyear has developed an extensive CR system in cooperation with IBM; the system was announced publicly in mid-1974. The rate files are quite large, with 140 class rate tables, 40,000 individual commodity rates, 300+ locations, 1,240 STCC codes, 3,500 carriers and many other items. Goodyear uses a logical rate search (generative CR). The traffic has a daily volume of 5,000 B/L using 94 percent motor carriers. The system is used to calculate freight charges on rail and motor carrier moves, to audit F/B's after payment and to store data for distribution analysis. It is part of a very large MIS system. The Goodyear system has been running three years. In 1973, Goodyear recovered $800,000 in outbound freight charges by claims (out of a total of $80,000,000 charges). Rate maintenance has been easy except when it was allowed to fall behind. Two ratemen analyze incoming supplements and code the changes. Before this system, Goodyear had been running a computerized Freight Payment System. Among the new users is Occidental Petroleum at Hooker Chemical.

SHIPPERS (Service Firms)

Distribution Sciences, Inc., offers rating services to a number of shippers, including Ford, Lever Bros., Dupont and Bristol Meyer. DSI uses a "logical" rate search on all types of rates and stores the rates in a near-tariff format. They use STCC, SPLC and SCAC in an augmented version; translation from internal codes is no problem. The main system, Auto Rate, accepts B/L's as input, rates them and feeds the results back to the client for A/R and MIS uses. DSI rate files include all major bureau issue class rate tariffs, many motor and rail commodity rates and other rates used by specific clients. DSI markets these rate files also.

Comtrac offers several types of traffic functions to 600 shippers nationwide. They audit and pay F/B's, generate distribution reports, monitor loss/damage claims and perform consulting tasks. Their audit is partly CR now and is being cut over toward completely CR. They have found that CR is not economical for small shippers at this point. They deal with 15,000 carriers, many of

them small. Their codes are internal codes; they have "reconstructed" the tariffs to store them in the computer. Their actual CR system and maintenance techniques are still confidential.

Numerax offers two types of rating services. Their QUIK-RATE is a well-established rate guide, listing all class rates (classes 35 to 500) from a given origin to 40,000 destinations as well as rates for five other modes: REA, UPS, Parcel Post, Air Express, and Air Parcel Post. This service has approximately 2,000 users.

Numerax is now offering a new service, TARPS, which will rate B/L's for shippers, match these against the rated F/B's from the carriers, perform an audit, and make a payment if the freight charge is correct. This CR system is generative and can audit 90 percent of the bills, excluding UPS. TARPS uses a revised version of SPLC, carriers codes from NMAC, completely internal shipper codes, and converts the clients' commodity codes to the NMFC. This latter translation is a slight problem with each new client. At present, TARPS has 18 customers.

CARRIERS (Rail)

Following the work of the Joint Rail Tariff Computerization Committee in publishing tariffs successfully (although not without some difficulty), the JRTCC examined how rail carriers could best store and retrieve rail rates. Over the period 1970-71, the Reprate system was chosen. This involved identifying those moves of a carrier which were "repetitive." (This definition varies widely between carriers - it may be 6 to 60 moves per year. These movements were to be assigned a unique Repetitive Waybill Code (RWC) which would index all pertinent information on the waybill, including rates and freight charges.)

CR systems based on this concept are quite similar structurally. The rate files are individualized to each carrier's traffic, the CR system is expected to rate 70-80 percent of the freight bills, and the movements are mainly commodity rate ones.

Louisville & Nashville RR is developing a CR system involving teleprocessing and real-time applications. The freight agent would provide enough information, by terminal, to extract a rated F/B from the central files and to apply the information to his shipment. Their pilot system will come on line in August in their Louisville yard; it will be limited initially to single-car, single commodity shipments. 70-80 percent rating of F/B by CR is expected. The rate updates will be keyed on commodity. MIS linkage is planned as a next step.

Grand Trunk Western RR is developing a Reprate CR system which will be tied into their MIS. Terminal inquiries will link to a small number of central processing areas. GT & W will centralize their billing and will link the CR with MIS. They expect to rate more than 70 percent of their F/B's on the computer. The system is still in a development stage.

Southern RR is using a Reprate approach in a two-stage application. First, they will produce a computer-printed pony for each freight agent, sequenced by customer number, etc. Next, they will go on to a terminal inquiry system. This latter step is difficult because of the current method of rate changes. A Centralized Rating Bureau in Southern will maintain the ponies. They are examining the traffic at one of their North Carolina offices for this CR application. There are some rate problems (such as "transit") which are not easily solvable and are expected to be manually rated for many years. Southern utilizes some preprinted B/L's to clean up information.

Missouri Pacific (MOP) was mentioned by many as a leader in the Reprate development. MOP presently uses an "AUTOBILL" system which computerizes the billing, but not necessarily the rating, of a waybill. AUTOBILL handles all originating and some received or switched traffic. The rates are sometimes available from computer storage. When they are not, the waybill data is flashed via cathode ray tube (CRT) to ratemen and the proper rate is computed. AUTOBILL stores shipment information by "patterns," based on the repetitive movement concept. MOP has collected

roughly 12,000 patterns and about 6,000 are operational. MOP does not currently have a CR project underway.

Other rail carriers have been active in Reprate discussions and systems design, including Illinois Central Gulf and Penn Central. However, the first operational use of a Reprate system for rating itself is yet to be achieved. It is worth noting that one of the most active railroads in the development of data processing for control and management information, Southern Pacific, has no present Reprate project and did not seem to feel that it was an economically feasible concept yet.

CARRIERS (Motor)

Nestor Brothers is a small trucking firm who successfully maintained a CR system for two years. The system rated 400-500 F/B's per night in a batch processing application. The rate files included most tariffs from the Middle Atlantic, N.Y. Motor Carrier and Niagara Frontier Conferences. Also, there were specific commodity rates and exceptions to the NMFC. The files reflected a very terse pony. Four thousand O/D points and 1,4000 commodities were handled with internal codes. 95 percent of the F/B's were handled by CR - exceptions were multiple stops, long bills and three line hauls. The computer was removed, along with CR, when Nestor sold some of its traffic in 1973 and reduced the volume below an economically feasible point. The firm is considering re-establishing the system on a mini-computer.

St. Johnsbury was one of the first motor carriers to explore CR. Their early work with Honeywell was not fruitful and they are rating manually at present. However, St. Johnsbury is testing a real-time, on-line, billing system similar to IML. It will connect with traffic analysis, accounts receivable, customer analysis and billing. By centralizing their rating function and using CRT techniques, they expect to improve the accuracy of their F/B rating They use internal codes. Their prime argument against CR is the cumbersome data entry.

Spector Freight employs computer assisted rating but not rating by computer. A rating clerk enters the origin and destination on a CRT and receives a message giving the rate basis number, class tariff number, and joint line pro-rate, if necessary. The clerk enters the correct rate and the computer extends it. When the origin/destination pair is not recognized by the computer or when the bill involves a difficult rules application, the rater does not rate search himself. The computer file matches about 70% of the O-D pairs on shipments. Fifty thousand F/B's a week can be processed comfortably. Internal codes are used, including alphabetic descriptions of commodities. Advantages of the system have included the following: 1) A reduction in the error rate within the rating function to below 3%; 2) A decrease in the staff hours spent on rating overall (billing, auditing, and tariff maintenance); and 3) An increased ability to do rate analysis for their management information system. Spector is now forming a subsidiary with the intention of marketing this system.

MOTOR CARRIERS (Service Firms)

Transportation Management Services (TMS) offers a billing/payment and MIS package to motor carriers, particularly in the western states. Their rating method is semi-automated (CRT) and uses the information from regular B/L's. No standard codes. TMS is converting to a full CR system based on repetitive movements. Details of this were not available at present.

Compulade recently entered CR after three years of development. They perform a generative rate search for motor carriers on all class and commodity rates in the Middle Atlantic and N.Y. Motor Carrier conferences. They use internal coding, accepting alphabetic commodity descriptions. 92 percent of their movements are on class-rate minimum charges. Compulade will handle rating/billing and transmission of the waybill information to the destination terminal. Rate maintenance has not been a problem, they will convert the Eastern Central and Niagara Frontier tariffs next.

GOVERNMENT SHIPPERS

The U. S. Government, represented by GSA, DOD, USDA and GAO, is the largest shipper in the world. Besides the sheer volume of shipments, the variety is also impressive -- practically all commodities and all modes are used. This presents a complex problem in trying to attain efficient and reliable transportation services at the best price. In treating this problem, the Government shippers are in an unusual bargaining position. They can generally negotiate rates with carriers which grant special privileges to them because of the volume of traffic and because of Section 22 exceptions.

DOD and GSA have alleviated their rating problem to a degree by using FAK (freight all kinds) rates. In essence, FAK rates are a pure weight-distance scale, where everything in the shipment is classified together. This classification is negotiated on the basis of past traffic data. Such a simple relationship makes the computation of rates quite easy.

While the success of FAK rates in government shipments is undeniable, their extension into the private sector has been limited, although it can be argued that unit train rates and other innovations have achieved the same results. Carriers feel that the use of FAK rates decreases their pricing freedom and increases their risk. Although these points have not been shown to be true, carriers are generally loath to set the precedent of granting FAK rates to one customer or on one type of movement, lest other shippers petition for them also through analogy.

GSA uses CR on their FAK rates. 80 percent of their traffic falls in this category. Manual processing of FAK rates handles much of the rest. Their system will be undergoing expansion in the near future.

DOD (MTMTS) has also applied FAK rates to a large portion of their shipments. Ponies are sent to all Transportation Officers (T.O.'s). Since the rates are simplified, computerization is unnecessary. The T.O.'s are being required to code NMFC/UFC,

SPLC and SCAC numbers on each government B/L. MTMTS is currently planning a Freight Control System using a form of CR. Rate files of Reprate nature would be maintained and would be available to the T.O.'s via terminals. The main purpose of the system would be to control the cost and timing of the shipments.

Because GAO audits all government shipments it has the largest rate staff known. Most of the rating is manual, but Domestic Household Goods have been computerized. This was aided by the fact that these rates are established on a mileage basis. GAO is planning to expand their CR with a very large stored-rate system. Even purging 'unused' rates they may have to format and encode approximately two million class rates and 500,000 commodity rates. Their present CR has resulted in a much higher return on their audit fuction due to more overage claims.

Two other federal systems are at the development stage. The first project involves the computerization of freight rates for the National Fertilizer Development Center (NFDC) of the Tennessee Valley Authority (TVA). These rates would apply to shipments of fertilizer products, sulfur and ammonia, mainly in the southeastern U.S. This CR system would be part of a larger logistical control system that would handle freight transportation for the members of NFDC. Hopefully, the overall system will be able to process data from advance requests for a carrier to the final payments and logistical analysis. The NFDC is working with two of their rating groups in TVA and with the Control Data Corporation in this early planning stage.

The other CR development is the Prairie Village Commodity Office (PVCO) which handles grain storage and shipments for the Department of Agriculture's price support program. Each year PVCO takes over a large inventory of grain, stores it in their 7,000 elevators around the country, moves it between these elevators and sells it domestically or internationally. The volume of the traffic is about 100,000 F/B's a year. The rates involve 3,200 tariffs and can be complex because of frequent "transit"

applications. PVCO is designing a CR system to handle their rating problems; they are also negotiating a shipper-carrier linkage system with several railroads.

OTHER

Two other CR projects should be mentioned. First, the Rocky Mountain Motor Tariff Bureau is constructing a computer data base on their rates. It could be used jointly with a CR system they are developing. This service will be available to their members in a few years.

Finally, the Bank of America project was outstanding in the 1970 era both in the scope of the market and the technical complexity. The system was meant to process all motor freight shipments in the U. S. It would receive input from truck terminals, prepare and rate the F/B, and effect a direct settlement or prepare the accounts receivable. They hoped to translate directly from the handwritten B/L to the sets of codes in the computer (STCC, SCAC, etc.). The project ran from 1969 to 1972 when it was terminated still in the planning stage. The reasons given for the failure vary: the illogic nature of tariff information and the corresponding inability to store it logically; the cost and difficulty of maintaining such a large communications network; the failure to prove that such a large market existed; and the disinclination to invest tens of millions into an untested project.

APPENDIX A-2. STATUS OF THE MAJOR STANDARD CODES

This material is used with the permission of the Transportation Data Coordinating Committee.

STANDARD TRANSPORTATION COMMODITY CODE

The Standard Transportation Commodity Code (STCC) is designed to identify all commodities or articles which move or may move in freight transportation. It is intended to serve as a commodity "common language" for transportation. The code's structure permits continuous revision to reflect the changing character in commerce.

Commodities in the STCC are classified according to the industry which normally produces them. The first five digits of the STCC coincide with the Commodity Classification for Transportation Statistics, adopted for use in the Census of Transportation from the Standard Industrial Classification. The SIC is used for the collection and publication of production statistics.

The individual article descriptions in the STCC provide a means for specific commodity identification at the seven digit level. These are grouped into related Product Classes at the five digit level and according to Industries identified at the four digit level.

The four digit Industries are then grouped into Minor Industry groups at the three digit level and, in turn, into two digit Major Industry groups.

The STCC file contains 14,500 individual commodity descriptions identified with a seven digit number.

STANDARD POINT LOCATION CODE

The Standard Point Location Code (SPLC) identifies each community in the United States by a six digit structured number. The first and second digits of the code identify a state or a portion thereof. The third and fourth digits identify a county or its

equivalent. When taken together, the first four digits of the code provide a unique number for each county or its equivalent or portion thereof.

The fifth and sixth digits identify a point as a part of the area covered by the first four digits of the code. The entire six digits provide unique codes for particular cities, towns, villages, communities or other areas which are treated as units for the application of rates in the United States.

The Canadian SPLC consists of a six digit number which describes each place of transportation significance and identifies the location and its provincial or territorial location. Blocks of numbers comprised of the first three digits are reserved for province identification. These blocks were developed from national marketing or rate making territories or areas where connections with other areas are limited by the number of railway junctions or main highways.

The combined motor carrier and railroad tape file for the United States contains 142,500 records. The Canadian file at this time contains 12,000 records.

STANDARD CARRIER ALPHA CODE

The Standard Carrier Alpha Code (SCAC) lists and codes transportation carriers operating in North America. The SCAC program contemplates that each carrier will be assigned a unique four letter (alpha) code for use as an abbreviation or to identify a particular carrier for transportation data processing purposes. The combination of letters used by any one carrier does not conflict with those assigned to other carriers, even though such other carriers may belong to a different mode.

The SCAC Directory contains two sections. Section 1 is an alphabetical arrangement of carrier names. Section 2 is an alphabetical arrangement of carrier codes.

D-U-N-S NUMBER

The D-U-N-S Number is a nine digit nonintelligent, randomly assigned, unique, computer created, validatable number that Dun & Bradstreet assigns to business establishments. The number is assigned and maintained by Dun & Bradstreet to the names and addresses of business establishments conducting commercial and industrial business transactions. The Dun's system is designed to accommodate the addition of establishments to the file for users through various supplementary services sold by Dun & Bradstreet. The Dun's system is currently being expanded to include business establishments in twenty-five foreign countries. A Canadian establishments D-U-N-S Number file is available.

The D-U-N-S Number file for the United States contains 2,358,315 single business establishment locations; 254,963 headquarters locations; and 295,910 branch locations.

APPENDIX A-3. PROPOSAL TO PURGE UNUSED RATES

The following material is quoted with permission from a letter written by Dale Furnas (General Rate Manager, Phillips Petroleum) to Mr. Harold Harrinan (Office of Facilitation, DOT) on November 22, 1974. In the opinion of the author of this report, this proposal is a nicely conceived, reasonable approach to deleting superflous material from the rate tariffs.

Brief Resume of our Recommendations

1. Publish in a "consolidation" supplement, rates, etc. which moved traffic during the past three years.
2. For rates, etc. which had not moved traffic during past three years, provide a one-year grace period for any party to request rates, etc. in which he is interested to be moved forward into the "consolidation" supplement(s).
3. Cancel all rates, etc. which at end of one-year grace period still reside in original tariff or in supplements which preceded the initial "consolidation" supplement.

At the Transportation Data Coordinating Committee Annual Forum in 1970, Alan Boyd at one point in his address made the following comment:

> "Rather than risk drowning in an attempt to surround the historical trillion-or-so rates that already exist--perhaps the ICC, the DOT, the NIT league and a grateful nation could simply ask the railroads to simplify the task of rate rationalization by simply maintaining a record of all tariffs actually used to move freight for the three years. Whatever tariff items were actually used could become the railroads tariff--and all other tariffs could be abolished."

We wholeheartedly subscribe to the suggestion of assembling a record of tariffs (and rates, etc. therein) used to move freight for a three-year period. Concerning the suggestion contained in the concluding sentence of the above quotation, we recommend the following modifications.

(1) From the three year record we suggest a "consolidation" supplement be published to each tariff identified in the the record. These "consolidation" supplements would contain the tariff items, rates, rules, regulations and routes governing the movement of freight during the three-year period.

(2) Upon issuance of the "consolidation" supplement, we would not at that point in time cancel the items, etc. remaining in the original tariffs and preceding supplements.

(3) With appropriate (regulatory) agency blanket approval, in each "consolidation" supplement a conspicuous rule would notify the public that all tariff items, rates, rules, regulations and routes contained in the original tariff and preceding supplements and not appearing in the initial "consolidation" supplement, would at the end of one year be summarily cancelled from the tariff; EXCEPT, that during the one-year period any tariff item, rate, rule, regulation or route not appearing in the initial "consolidation" supplement would upon request of any interested party be included in a subsequent "consolidation" supplement.

After cancellation of the original tariff and preceding supplements, the "consolidation" supplement(s) would become the complete tariff.

Benefits which would accrue from the suggestions in (1), (2) and (3) above:

(1) (2)

No party could protest the three year record being consol idated into a single supplement to each tariff.

(3)

By giving all parties the opportunity to have rates, etc. which were not used during the three-year period carried forward into a "consolidation" supplement, there should

be no protests at the end of one year to cancelling the remaining rates, etc. from the original tariff and supplements which preceded the initial "consolidation" supplement.

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