

REPORT ON STUDY OF  
**ADMINISTRATION, ORGANIZATION  
AND METHODS**  
OF THE  
**WAREHOUSE AND MOTOR VEHICLE  
REPAIR SHOP OF STICA**

SAN JOSE , COSTA RICA

**FOA**



UNITED STATES OF AMERICA



UNITED STATES OPERATIONS MISSION TO COSTA RICA  
INSTITUTE OF INTER-AMERICAN AFFAIRS  
DIVISION OF PUBLIC ADMINISTRATION

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*This report is a summary of the work improvements carried out at the STICA Warehouse and garage in San Jose, Costa Rica, during 1953.*

*Work improvements were installed by Frank Macdonald, Asst. Business Manager of the Agriculture and Natural Resources Field Party and Assistant Manager of STICA.*

*The organization and methods study on which most of the work improvement plans were based was carried out by Paul J. Hazur, Public Administration Advisor, FOA.*

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## BACKGROUND

In December 1952, the Public Administration Division of the United States Operations Mission to Costa Rica made an administrative study of the garage and warehouse of the Servicio Tecnico Interamericano de Cooperacion Agricola (STICA).

The study revealed the need to:

1. Strengthen the organization and supervision of the garage and warehouse.
2. Improve utilization of space.
3. Develop a program of preventive maintenance for motor vehicles.
4. Establish a driver testing and training program.
5. Increase control over official vehicles.
6. Improve planning of requisitioning of supplies.

Recommendations for changes in the above areas were submitted with the suggestion that STICA establish a work improvement program to place those recommendations which received approval of STICA Management into operation.

From February to May 1953, STICA reorganized the warehouse and garage and placed most of the recommendations of the above study into effect. The remaining recommendations were held up due to difficulties in establishing work plans for their installation. In May 1953, STICA requested the Public Administration Division to help develop such plans. At the same time a request was made for an Organization and Methods Study of the motor vehicle program in order to develop recommendations to speed-up and improve motor vehicle repairs, service and maintenance. The reorganization and work improvement programs were directed by Frank McDonald, Assistant Business Manager of the Agriculture and Natural Resources Field Party of the Institute of Inter-American Affairs. He was assisted in developing organizational plans and operational procedures by Paul J. Hazur, Public Administration Advisor who was assigned as technical consultant to STICA and developed specific plans on how to carry out recommendations derived from the original and subsequent surveys.

This report is divided into two parts. Part I is a follow-up on the original study and describes the work done during reorganization when thirteen of the twenty-five recommendations of the report were placed into effect. Part II describes the work improvement plans developed to place the remaining recommendations into action. It also summarizes the organization and methods survey made on the motor vehicle repair service and lists the work changes accomplished through the end of 1953.

The motor vehicle repair service is an independent project of STICA which has for its purpose the maintenance and repair of two hundred and nineteen motor vehicles, one hundred and seventy three of which belong to STICA, thirty two to the Ministry of Agriculture and fourteen to the Agriculture and Natural Resources Field Party of the Institute. The project is mainly supported by funds derived from reimbursement for motor vehicle repairs made for other STICA projects, the Ministry of Agriculture, and the Institute. In addition STICA must provide funds in its annual budget to pay the overhead and operating expenses not covered by reimbursement.

When the motor vehicle repair project was originally established it was intended that the garage operate on a self-supporting basis, and that the charges for all the repair work performed by the garage be sufficient to cover mechanic's wages and overhead. When the survey was started it appeared that too much emphasis was placed on the raising of repair rates in order to increase the garage income. If rates charged for labor by the garage are high enough the garage can easily operate as a self supporting project. However, at the beginning of the survey some of the rates for repairs were much higher than rates for the equivalent work done in outside garages.

Real savings can be achieved only when the total cost of all spare parts, workers wages and overhead can be materially reduced and not when the garage income exceeds expenses since the majority of the vehicles belong to STICA. A schedule of flat rates was established at levels far below the charges for similar repair work done at outside garages, yet high enough to cover salaries and part of the garage overhead. Previous to the survey, costs of vehicle operations and maintenance were computed on the total motor vehicle expenses for each project and it was very difficult to obtain cost data on any individual vehicle. Records have now been established to give detailed expenses on every vehicle serviced by the garage. These records will be very beneficial in helping to determine how effectively the work improvement and preventive maintenance programs can reduce future vehicle operation and maintenance costs.

It is difficult to measure savings realized as a result of the work improvement programs carried out during 1953, however it is likely that savings were considerable. Even though incomes derived from reimbursement by other projects on vehicle repairs will be less during 1954 since repair charges are now lower the total budget required for the garage project was reduced about three thousand dollars (\$3,000.00). In addition to savings in money STICA officials estimate that the efficiency of their motor vehicle service was increased by more than 100 percent as of December, 1953.

## PART I: A FOLLOW-UP ON STUDY OF DECEMBER, 1952

Findings of the administrative survey made in December 1952, were summarized on the first page of the survey report. (*"Administration of the Central STICA Garage and Warehouse in San Jose, Costa Rica"*, by Phillips and Muñoz). The report states: "On the whole internal controls and procedures within the Bodega (warehouse) are effective. Some improvements might be effected by giving further attention to internal organization and methods of supervision. Similarly some improvements in regard to the dispatch of supplies can be effected by more attention to advance planning and systematic ordering on the part of the agencies. The motor vehicle problem is more complex and its solution will involve a four point program: more and better space for the Bodega, a preventive maintenance program for motor vehicles, training of agency and other STICA employees in the operation and maintenance of motor vehicles and more effective control of the use of official cars. The solution of these inter-related problems lies beyond the province of the Bodega and will necessitate the cooperation of many STICA officials and employees."

Recommendations were developed where it appeared attention was most needed. During reorganization, action was limited to those recommendations which involved short term planning only and covered improvements in organization, supervision, better utilization of space, and increased control of official vehicles.

### REORGANIZATION

The warehouse and garage, previously supervised by one employee were placed under separate supervision. The former chief of both operations was placed in charge of the warehouse. This involves the responsibility for: proper storage of approximately \$50 000.00 worth of materials and equipment; orderly distribution of an average of \$50 000.00 worth of materials and equipment per month to the thirty field agencies of STICA's agricultural extension service, supervising the motor vehicle pool, and dispatching motor vehicles.

The chief mechanic was placed in charge of the garage and was given the responsibility for: arranging shop layout to provide a more efficient flow of the vehicles which come into the shop each day for repair, inspecting all mechanical work done by the garage, assigning work to mechanics based on the knowledge of each worker's ability; and working with the chief of preventive maintenance in developing and carrying out an effective program for keeping all vehicles of STICA, the Agriculture and Natural Resources Field Party, and the Ministry of Agriculture in operating condition.

Both supervisors were given more authority with the Assistant Business Manager helping them mainly in a consultant capacity. Supervisors were assisted in developing work distribution and work assignment schedules. Some of their responsibilities which had previously involved too much loss of time on details were handed down to subordinate supervisors. This enabled the warehouse chief and mechanic to spend more time on work inspection, supervisory control, and employee training.

The Administration Division of STICA issued regulations, granting employees of the warehouse and garage over-time, per diem, and travel allowances, equivalent to those established in the schedules for central office employees. Policies were established on personnel recruitment, promotions, and disciplinary action in order to achieve uniformity and to allow supervisors to participate fully in personnel matters.

The garage and warehouse which jointly occupied three adjacent warehouses with a total area of 13 000 square feet were physically separated so that the warehouse was completely cut off from the garage. Previously there was much confusion and work was often interrupted because the warehouse and garage were not clearly marked off or divided into specific work and storage areas.

Obsolete, used, and damaged supplies and equipment had been allowed to accumulate for two years. A survey board appointed to get rid of this material arranged for its sale or transferred it to field establishments of STICA where it could be better used. This released a great deal of space for better utilization. Procedures were established to dispose of such material at regular intervals.

#### MOTOR VEHICLE POOL

A motor vehicle pool was formed and regulations were issued to control the use of all official vehicles of STICA and the Agriculture and Natural Resources Field Party. Responsibility for authorization of the use of official vehicles was placed with the Chief of Field Party and the Business Manager. A form was developed to request and authorize the use of official vehicles. The warehouse chief who serves as dispatcher designates the type of vehicle to be used on every authorization taking into consideration condition of the roads in the areas to be travelled, climate, and other factors. Additional chauffeurs were hired to provide sufficient drivers for all vehicles. Chauffeurs were made responsible for observing official speed limits as well as speed limits best suited for the vehicle, based on road and weather conditions, tire load, and type and state of vehicle. Also every chauffeur was made responsible for proper

operation and maintenance of the vehicle assigned to him and for making a prompt report of accidents even when there is only slight vehicle damage. Investigation showed that drivers had been too lax in reporting collisions.

The above measures resulted in considerable reduction in motor vehicle operation and maintenance expenses. Savings were especially great on vehicles assigned to the Province of Guanacaste where crushed stone roads caused extensive tire and chassis damage on account of motor vehicles being driven at excessive speeds. Failure to maintain proper oil and water levels in all areas where the climate was very hot and dusty also caused much damage. Repair expenses were highest when vehicles were used by many different drivers none of whom assumed sufficient responsibility for vehicle care and maintenance.

The carpenter shop was eliminated after a six month study by the Assistant Business Manager revealed that total work production of the shop compared with its expenses did not justify its continued operation.

The garage was divided into work areas for the following types of repair and service.

1. Motor overhaul
2. Body work and painting
3. Lubrication, oil change, and tire service
4. Clutch and brake service
5. Motor tune-up and minor adjustments
6. Battery and electrical service

Mechanics were assigned to each section according to their ability and work specialty. The chief mechanic was made responsible for checking on the progress of every work order and for inspecting and approving every vehicle before a job was finally approved and the vehicle returned to service.

#### REQUEST FOR FURTHER TECHNICAL ASSISTANCE

During the reorganization it appeared that additional assistance could be used in extending work improvement studies to the day-to-day operations of the garage and warehouse. Work assignments were often confused, numerous complaints had been registered with STICA officials on unsatisfactory vehicle repair services; repair costs which were charged to other projects and to the Ministry of Agriculture were highly variable for identical work; sometimes repairs were delayed for as long as a month because spare parts were not in stock or available in the local market, and there was always a big backlog of work. STICA therefore requested that a Public Administration Advisor be assigned to develop the recommendations of the original study which had not yet been placed into effect.



and to make an organization and methods analysis of the garage and repair shops in order to cut operating expenses, improve the quality of work, and speed up repairs.

## PART II WORK IMPROVEMENTS - THE PRODUCT OF THE ORGANIZATION AND METHODS SURVEY

The organization and methods survey was started in June, 1953. Work flow charts were drawn up for all procedures except mechanical operations. Work volume studies were made, and job descriptions and work distributions charts were prepared. A work improvement plan was developed which consisted of ninety-four recommendations in the following areas.

1. Changes in physical layout of warehouse and garage.
2. Changes in personnel administration, management, and supervision.
3. Establishment of a program of preventive maintenance for all official vehicles, and the creation of job of chief of preventive maintenance.
4. Work flow studies, work distribution studies, job analysis, and study of forms
5. Plans to improve the system of cost accounting to cover all garage operations.
6. Creation of job of motor vehicle dispatcher and plans for motor vehicle pool operations.
7. Plans for improvement of automobile spare parts supply and distribution systems.
8. Plans for improvement of the tire supply program and the establishment of a preventive maintenance program on tires.
9. Employee training, employee awards, and safety.

Recommendations were specific and simply stated and were translated into Spanish so that they could be thoroughly understood and applied by all supervisory levels. They were presented in the form of a check list so that they could be easily and quickly discussed and approved or rejected. The full list of recommendations is included in Appendix "A" Of the ninety-four recommendations made eighty eight were accepted and approved, forty-four were carried out before the end of 1953, and the remainder are either in the process of now being carried out or are included in long-term plans.

As a result of the original re-organization and subsequent work improvements, STICA officials estimate that they will save a considerable amount of money on garage operations during 1954. It is anticipated that even greater

savings will be realized as work improvements continue, especially when the proposed program of preventive maintenance is extended to all motor vehicles.

### PLANNING FOR QUICK RESULTS

Since a great deal of the success of the Agriculture Extension program depends upon sufficient and adequate transportation of employees and materials, priority was given to the work plans designed to immediately speed up and improve the repair service. The chief mechanic was helped to further arrange the layout of the garage in order to provide a free flow of vehicles. Previously too much time had been wasted moving and shifting vehicles. Minor repairs and services are made near the garage entrance. Vehicles brought in for repairs which require several days work or longer such as a motor overhaul or general overhaul are placed where they will least obstruct the passage of vehicles and workers. Space was marked off to improve the storage and removal of official vehicles parked in the garage every night.

A large wall which had originally been used as a roof support but was no longer necessary was torn down. Machines and equipment were located more conveniently to the work areas where they would be most often used. Machines and equipment which were seldom used were transferred to field repair shops where they could be fuller utilized.

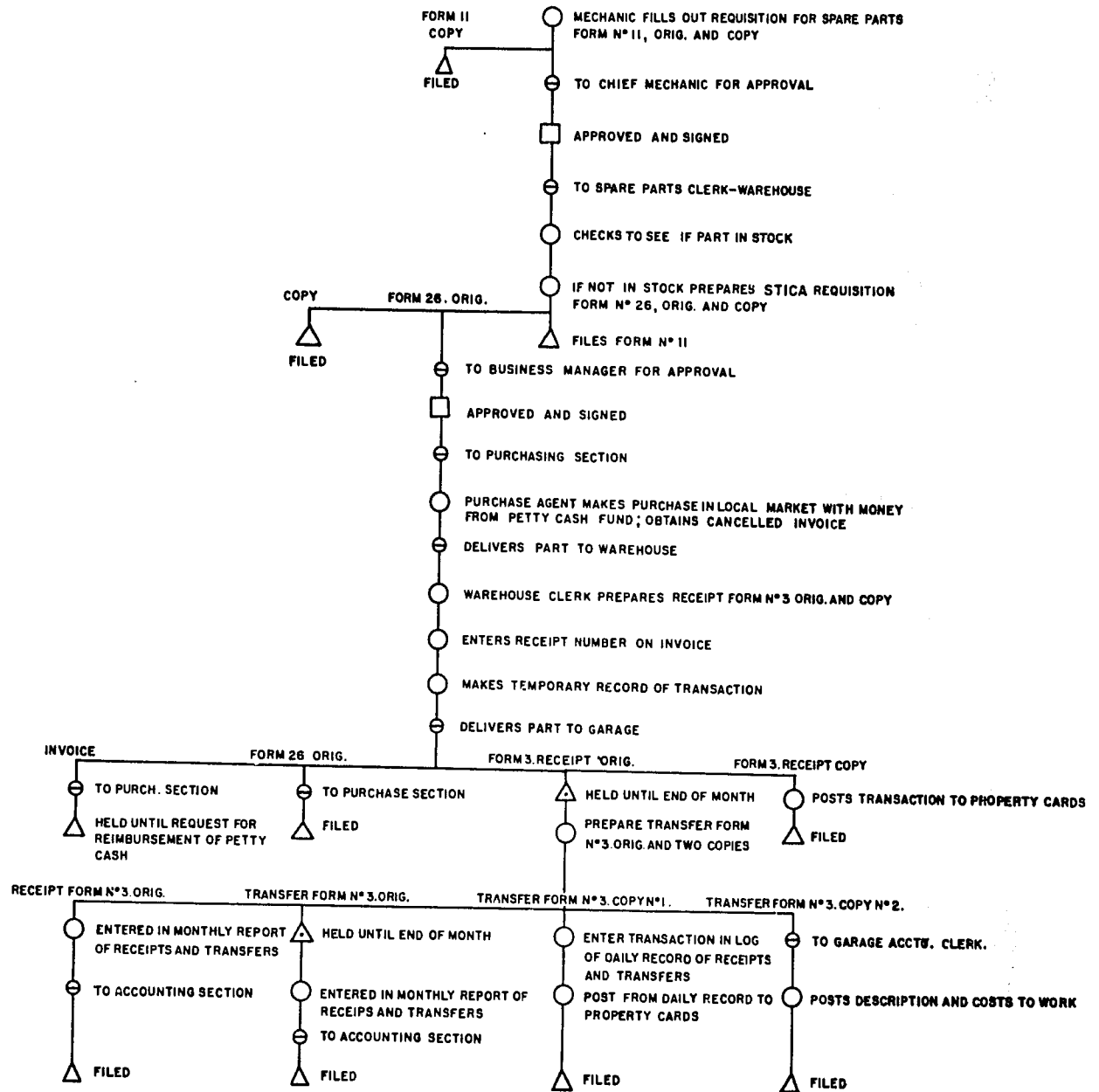
A large water tank which had not been previously used was cleaned out and a pump was installed to provide an adequate supply of water during the day. Since the garage is located in a low water pressure area many times vehicles were sent to outside service stations to be washed because water was not available at the garage.

A light meter showed that the mechanics were working in most parts of the garage with only five to ten foot candles of light. Fluorescent lamps were built by STICA's mechanics and installed throughout the garage and warehouse. In addition some parts of the garage were painted to provide more reflectance for the natural light which did enter. These steps increased the lighting intensity to between twenty to twenty-five foot candles throughout all working areas.

The systems of assigning work, checking work progress, inspecting work and controlling time were improved. Savings of time and labor were made by revising and simplifying the procedures for issuing spare parts and replacements from stock, making petty cash purchase of spare parts and replacements, processing work orders, posting charges for labor and costs to all records and forms, and keeping time and attendance records. Figure I illustrates the steps required to make a petty cash purchase of a spare part at the time of the survey.

**FIGURE 1**

**FLOW CHART OF STEPS REQUIRED FOR PETTY CASH PURCHASE OF MOTOR VEHICLE SPARE PARTS AT STICA GARAGE**



TOTAL OPERATIONS: 42

## SAVINGS THROUGH USE OF FLAT RATES

Flat rates were developed for twenty-eight motor vehicle repair and service operations. These are listed in Appendix "B". The use of flat rates eliminated a great deal of computation and bookkeeping. In addition they established uniform rates for identical work operations and sped up billing procedures. Under the old system of preparing work orders and computing charges there was an average delay of about six weeks in processing work orders and carrying out all the required accounting work. These operations are now completed in about one week. The flat rates include all labor charges. Prior to the use of flat rates study showed that there were highly variable charges for identical repairs. In many cases the total cost for repairs made by the STICA garage was higher than charges for equivalent work done by an outside garage. Some of the charges for similar jobs differed by as much as 300%. These differences came about mainly through errors in reporting time and through the inefficient distribution of work assignments. Labor costs were based on hourly wages, therefore, when a highly paid mechanic was assigned a routine job, the work order was charged three times as much as the labor costs for the same job when done by a mechanic's helper.

Almost all work orders included excessive charges for labor. This was due to employees charging time spent transferring vehicles, cleaning up the shop, etc. to work orders covering motor vehicle repairs. It was very difficult for the chief mechanic to correct such errors since employees did not fill out their time sheets until the end of each day and often did not fill them out for several days.

## SAVINGS THROUGH CHANGES IN FORMS

The chief mechanic's efficiency and supervisory effectiveness were considerably improved by simply adding a cardboard copy to the work order form. All work orders are prepared from either written or oral requisitions for vehicle repairs. Prior to the survey the work order was prepared as soon as a requisition was received. A tissue copy of the work order was given to the chief mechanic. He kept the copies on his desk and used them to assign work, and request the parts and replacements required for each job. Charges for labor were entered on these copies from the time sheets prepared by each employee. Much time was lost searching and handling the copies every time an employee was assigned a new task. There were numerous disadvantages to the above system.

A cardboard copy of the work order was printed to be placed on a vehicle as soon as it comes into the garage. On this copy the chief mechanic writes in

pencil what is to be done. Mechanics enter every operation with the time spent on each task directly to the cardboard copy. The chief mechanic maintains a record of every work order marking down an estimate of the time required for each order so that he can better control how every worker spends his time. Supervisors can determine the status of a work order by looking at the cardboard copy attached to the vehicle; the worker knows what he must do next without having to go to the chief mechanic for instructions since the cardboard copy tells the order in which work will be done. When a job is completed all of the information required to prepare the original work order is in one place. Previously, too much time was wasted making corrections after the original work order was prepared due to: (1) Mechanics finding additional work which had to be done on the vehicle. (2) Changes in the distribution of work hours. (3) Posting from requisitions the list of spare parts and replacements which were used in making repairs.

Paper work in the garage was reduced between ten and twenty percent by the above changes.

Rest rooms for workers were improved. Cover-alls for supervisors, overalls for mechanics, and uniforms for chauffeurs and other garage and warehouse employees were provided by STICA without cost to the employees. Regular rest periods were established. All of these measures helped improve worker attitudes and morale which in turn contributed to increased worker production.

#### PREVENTIVE MAINTENANCE - THE START OF A LONG TERM PLAN

An employee was promoted to the newly-created position of Chief of Preventive Maintenance. He was given the responsibility for developing a program of instruction and training for motor vehicle operators and mechanics and for installing a program of preventive maintenance for all official vehicles. Procedures were developed to insure that all vehicles receive periodic lubrication and oil change and that routine inspections and check ups are made, based on vehicle mileage, time in service and climatic conditions. The preventive maintenance program now covers thirty vehicles assigned to the motor vehicle pool, the Central Office, and the San Jose STICA Agency. This represents only twenty-five percent of STICA's and the Institute's vehicles. It is anticipated that during 1954 the preventive maintenance program will be extended to all vehicles serviced by the garage including those of the Ministry of Agriculture.

A form was drawn up which will be used to maintain a record of repair costs, fuel consumption and history of every vehicle. In addition the form will serve as a preventive maintenance schedule and vehicle operation check list. It will be referred to every time a vehicle comes into the garage for repair in

order to help the chief mechanic make a quicker diagnosis of what work might need to be done based on the history of past repairs. This will be especially important in cases where provisional repairs are made due to the nonavailability of some spare parts and replacements in the local market.

Lubrication charts, mechanical and electrical diagrams, pamphlets, books and printed information on safety, vehicle operation, automotive theory and vehicle repair were obtained and made available to chauffeurs and mechanics in order to help them do a better job.

A program of testing chauffeurs was begun by the Garage. In addition to having the official Costa Rican operator's license, motor vehicle operators are tested by STICA in order to demonstrate proficiency in driving and knowledge of principles of vehicle operation so that they may recognize danger signs which if given prompt attention may prevent large repair expenses. Drivers who are tested and approved are issued a card which indicates the type of vehicle they may drive such as passenger automobile, jeep, heavy truck or tractor.

Preliminary plans are being developed for a program of employee incentives. There are great differences in road conditions throughout the country, as well as differences in type of work assignment, climatic conditions and other factors. Therefore, it is recommended that this program be developed slowly, giving sufficient consideration to the establishment of prizes and awards based on zone of operations and type of vehicle.

## SUMMARY OF WORK IMPROVEMENTS

In addition to the above improvements, numerous minor changes were made at the warehouse and garage in order to improve safety, improve working conditions, raise work production, and increase employee utilization. Mechanic's benches and tools were placed adjacent to each work area in order to reduce time lost walking back and forth long distances. New tools have been provided to cut time and save on expenses which at times result from the damage of equipment due to the use of inappropriate tools. An electric air compressor was moved from its location near the garage entrance to a platform above the entrance -- in its previous location it represented a safety hazard as well as an obstruction to traffic. Employees were given demonstrations on the use of all types of the available fire fighting apparatus and shown how to fight fires which result from different sources.

## PLANS FOR THE FUTURE

Some of the recommendations which involve improvements in space utilization and work environment were held up because present quarters are rented and costs of property and building improvements would have to be borne by STICA alone. Land has been purchased in the outskirts of San Jose on which warehouses, garages, and repair shops will be built. Plans are being developed for much more efficient utilization of warehouse and garage space; full utilization of all space is now difficult because of the nature of the buildings.

The work improvements described above were carried out with no increase in personnel wages or total operating costs. Although STICA officials estimate that their overall operations have benefited considerably through the increase in efficiency of the garage and warehouse much remains to be done.

Figure II reveals that long-term plans for improvement include work in employee training, cost accounting, improved planning of spare parts purchases, and programs for the better care of tires and motor vehicles. These are areas which can lead to extensive savings and still greater efficiency.

A sample study made on expenses of twenty Institute and STICA vehicles showed that the first year's repair and up-keep costs for a new vehicle ranged from eighty dollars (\$80.00) to eight hundred dollars (\$800.00). An analysis of operation costs made by the dispatcher on vehicles of the motor pool showed it cost STICA and the Institute eighteen cents (\$.18) per mile to run its vehicles. This figure includes a deduction for depreciation but does not include chauffeur wages. It is anticipated that both of the above figures will be greatly reduced during the next few years.

FIGURE II

BREAKDOWN OF RECOMMENDATIONS OF ORGANIZATION AND METHODS SURVEY  
AS OF DECEMBER 31, 1953

<u>AREA OF PLANNING</u>	<u>NO. OF RECOM. MADE</u>	<u>NO. OF RECOM. ACCEPTED</u>	<u>NO. OF RECOM. CARRIED OUT</u>
1 - Physical layout of garage and warehouse	22	19	15
2 - Personnel administration management and supervision . . . . .	10	10	7
3 - Preventive maintenance - motor vehicles	9	9	2
4 - Work methods, procedures, systems . . .	13	13	10
5 - Cost accounting . . . . .	7	6	1
6 - Motor pool, dispatcher of vehicles . .	8	8	5
7 - Spare parts supply and distribution . .	9	8	1
8 - Preventive maintenance - tires . . . .	6	5	1
9 - Training; safety; awards . . . . .	10	10	2
TOTALS	94	88	44



## APPENDIX "A"

WORK PLANS FOR IMPROVEMENT OF ORGANIZATION,  
METHODS AND PROCEDURES AT STICA,  
CENTRAL WAREHOUSE AND GARAGE

- I. Changes in physical layout of warehouse and garage.
- II. Changes in personnel administration, management, and supervision.
- III. Establishment of a program of preventive maintenance for all official vehicles, and the creation of job of chief of preventive maintenance.
- IV. Work flow studies, work distribution studies, job analysis, and study of forms.
- V. Plans to improve the system of cost accounting to cover all garage operations.
- VI. Creation of Job of Motor Vehicle Dispatcher and plans for motor vehicle pool operations.
- VII. Plans for improvement of automobile spare parts supply and distribution systems.
- VIII. Plans for development of adequate tire supply program and establishment of preventive maintenance program for all tires.
- IX. Employee training, awards, and safety.

## RECOMMENDATIONS

- I. Changes in physical layout of warehouse and garage.
- (1) Obtain a floor plan or have a floor plan made of the warehouse and garage. Enough copies should be obtained in order to use them as work sheets in revising the present space according to requirements.
  - (2) Mark in on the plan recommended layout of different sections within the garage.
  - (3) Determine sections of space layout for an orderly distribution of repair work. Tentative plans include establishment of the following sections:
    - a) lubrication
    - b) brakes
    - c) transmissions
    - d) electricity
    - e) radiators
    - f) overhaul
    - g) body work
    - h) service station
  - (4) Based on the distribution of space for the above sections determine the best placement of equipment and machines such as lathe, drill, grinders, etc.
  - (5) Tear down the center wall in the main garage.
  - (6) Paint the under-surface of the roof and all of the walls in order to obtain more reflectance of light. Get in touch with the owner of the Protecto Paint Shop. their paint appears to be the best buy in the local market; he can advise us on the type and quantity of paint needed and he can prepare it to the consistency needed for spraying. It is suggested that the paint be sprayed so that we can get the job finished in a hurry.
  - (7) Determine the number of fluorescent lamps needed to provide adequate light throughout the garage and warehouse. Indicate on a rough floor plan where these lamps should be placed; determine the quantity needed and place an order for them. Check the price of industrial type lights available from various local distributors and determine whether or not it will be more practical to order the lights directly from the United States instead of continuing to make them at the garage.
  - (8) Clean out the water tank and obtain an electric pump in order to provide an adequate supply of water. Install pipe line to proposed showers and to car wash.
  - (9) Install shower baths and toilets. If the owner of the Bodega is not willing to share in this expense get the help of a SCISP sanitary engineer in

- giving advice on the installation of portable units and partitions which can be easily removed.
- (10) Move the large air compressor to a place where it will be safe from danger of being bumped by a motor vehicle. It appears that the compressor might be placed up above the present gasoline pump. The ceiling above the gasoline pump should be checked to see that it is strong enough and to see that it is completely fire proof.
  - (11) Mark floors to provide lanes for motor vehicles and areas for parking of cars brought into the garage for repair.
  - (12) Examine the feasibility of using one gate for the entrance and one gate for the exit.
  - (13) Check the work orders given to the carpenter shop for work benches. It appears that these benches could be made a little bit smaller. Have the shop build small portable benches for each section of the garage so that the mechanic can put his tools on it and move them to wherever he is working.
  - (14) Determine whether or not the present drill should be placed in the carpenter shop it is more frequently used by the carpenters than mechanics and considerable time is lost by the carpenters walking back and forth. This drill is a high speed drill and Mr. Sibaja feels it will be better for us to order a lower speed drill for use in the mechanic shop, and transfer the present drill to the carpenter shop.
  - (15) Change the location of the office from the rear of the warehouse to a more accessible position near the front.
  - (16) Change the location of the automobile spare parts room from its present location to the space now occupied by the office, using the two windows recently made in the office as checking out points for all parts and tools.
  - (17) Build a tool board for all Stica and Institute tools.
  - (18) Look over all of the junk now stored in the warehouse. Determine what can be salvaged and make an immediate decision on its disposition so as to sell or throw away everything that it is not required.
  - (19) Decide on the distribution of present space to provide a better arrangement of activities. Perhaps storage and dispatch can be moved to the warehouse near the SCISP Plantel. This would free sufficient space to permit all of the shops to be in one place.
  - (20) Determine best location for office, working in physical layout to meet needs of the newly revised system on placing and making work orders and routing the vehicles for fast repair.
  - (21) Check on wiring of garage to see if it should not be changed to meet machine requirements.

- (22) Check on establishment of car washing and polishing service, charging prices low enough to justify such a program and yet high enough to pay all expenses.

II. Changes in personnel administration, management, and supervision.

- (1) Make a new organization chart slotting personnel tentatively into the chart.
- (2) Choose the personnel for the top jobs. Get them together and form committees for all of the work required to re-organize the shop.
- (3) Write job descriptions for every job in the shops and bodega based on the new organization chart.
- (4) Establish testing programs to include:
- a) Examination or other practical test to determine the qualifications of the mechanics already working.
  - b) A written test plus practical examinations to determine the fitness of applicants for mechanic jobs.
  - c) A written and practical test for all employees of the Institute and STICA to see if they are qualified to drive vehicles.
- The test should cover driving rules and regulations, driving sense, and measure mechanical knowledge of vehicle to find out if driver is able to notice any noises, etc., which might be symptoms of mechanical difficulty in their vehicle.*
- (5) It is suggested that a card be printed which will certify that an employee is authorized to drive an official vehicle. This card should be issued to qualifying drivers regardless of the fact that the person already has an authorized operators license, however it should not be issued unless the employee is authorized to drive. The card should also specify the type of vehicle which an employee may drive. Break the distribution down into something like:
- a) Heavy equipment, include tractors
  - b) Heavy trucks
  - c) Light trucks
  - d) Vehicle with 4 wheel drive
  - e) Passenger automobiles or light vehicles with only two wheel drive.
- (this plan should be worked out for more satisfactory distribution)*
- (6) Write clear cut statements of responsibility and delegations of authority for all personnel.
- (7) Provide coveralls for workers, white ones for supervisors, devise plan to have workers pay for them through payroll deductions.
- (8) Obtain protective clothing for men using torches.

- (9) Have periodic meetings with business manager. Arrange methods of reporting infractions of systems established for preventive maintenance programs. Acknowledge all complaints immediately arriving at a decision quickly so that workers don't feel their job is hopeless.
- (10) Arrange for establishment of Safety Committee, Board of Survey, Accident Investigation board, make these committees active through regular meetings.

### III. Establishment of a program of preventive maintenance for all official vehicles, and the creation of Job of Chief of Preventive Maintenance.

- (1) Develop a library of material on preventive maintenance of motor vehicles. Have material which is considered most appropriate for drivers use translated into Spanish and put in the form of a pamphlet. Issue monthly informative circulars on preventive maintenance to all personnel who drive official vehicles.
- (2) Establish a motor vehicle history card for every unit of IIAA and STICA. Devise and establish a simple system for keeping this card up to date.
- (3) Establish a file which will include a copy of every work order. Check the possibility of obtaining such a file now kept in the central office in the purchase section and very seldom used. Perhaps after they finish with the copy usually sent to the accounting section this copy may be forwarded to the preventive maintenance unit for filing. Such file can be of great help to mechanics especially when their diagnosis is faulty.
- (4) Establish a program for testing every driver and for training those, such as agents in the field who do not meet the requirements of the driver training program.
- (5) Figure out a way to check all cars which do not report into the central office. Establish a program for a regular maintenance check of all vehicles.
- (6) Obtain gummed stickers to be placed on the door panel of vehicles which show the amount of kilometrage at the time of lubrication and oil change. These can probably be obtained from the Oil Company with which we do business.
- (7) Establish some system of advising all drivers on the importance of preventive maintenance and establish maintenance routine which is easy for every driver to follow. Establish a follow up system to make sure regular maintenance checks are made. Get together with the business manager and chief of party if necessary to establish the system necessary to provide some means of discipline in case drivers fail to carry out their part of the preventive maintenance program.
- (8) Tie in dispatcher's job to preventive maintenance schedule to make sure cars are immediately lubricated and that oil is changed after trips to dry and dusty areas or after trips under other special conditions.

- (9) Maintain records on batteries assigned to cars. Investigate cases of battery theft and cases in which batteries last only a few months.

IV. Work flow studies, work distribution studies, job analysis, and study of forms.

- (1) Job analysis and job descriptions.
- (2) Make work flow charts on each phase of major activity within the bodega and the garage, for example repair of motor vehicles, battery charging or repair, parts control and distribution, dispatch of warehouse materials, and other phases which are considered important enough to outline on flow charts which may be available to all supervisors so that they know exactly what is going on in every part of the warehouse and garage.
- (3) Develop new forms for:
  - a) Motor Vehicle Work Order
  - b) Motor Vehicle History
- (4) Review other forms used by the warehouse and garage to determine if they are adequate and if they are doing the job.
- (5) Review the operations performed in the various departments in order to obtain some figure on present costs which may be used at a future date to compare whether or not costs have been lowered through the introduction of methods to increase efficiency and economize on overhead.
- (6) Determine some methods of working out the daily work distribution for every mechanic and worker in the bodega and shops.
- (7) Determine the number of cars which can be serviced daily in each section, allotting work to prevent backlogs in a particular section.
- (8) Work out a plan to provide for the coordination of all operations within the mechanic shop.
- (9) Devise a simple system of work reports, parts requisitions, etc., so that all of the operations of mechanics may be less time-consuming. Perhaps all of these operations can be done on the motor vehicle work order.
- (10) Assist mechanics in developing work flow charts on major repair operations. See if some of the steps can be eliminated to save them time.
- (11) Make cost estimates immediately on all jobs and projects requiring spending to enable business manager to provide sufficient funds to put the garage program in good shape
- (12) Make list of special Jeep tools which if purchased can speed up work and reduce chance of damage to equipment through use of inappropriate tools.
- (13) Translate sections of motor vehicle instructions regarding symptoms of motor defects into Spanish so that mechanics can be more efficient in diagnosing repairs to be made.

V. Plans to improve the cost accounting system to cover all garage operations..

- (1) Establish a simple cost accounting system for the garage.
- (2) Determine average flat rates for various repair jobs based on comparison with established rates in garages in San Jose. This rate should be used as a standard against which to compare future rates to see if there is any gain in efficiency through increased skill on the part of the mechanics, increased knowledge on the part of the mechanics, and other factors which might cut down on the time required to do each job. Flat rates will considerably reduce the paper work now being done by the garage.
- (3) Determine the rates for rent, electricity, water, expendable tools, cleaning waste, etc. Provide for these materials in the budget using profits on rates charged to reduce this sum. Establish property record cards to determine prices of all tools, equipment and materials.
- (4) Get a set figure for the amount of automobile spare parts and tires which should be kept in stock. Based on current needs, establish perpetual inventory system and procedures to place orders periodically based on diminishing inventories.
- (5) Keep reports on the cost of motor vehicle repair and upkeep. Get information from the accounting section of STICA on cost of repairs by Project per month. Get information from extension office on cost of fuel consumption and repairs for cars not reporting to the central garage.
- (6) Get total cost of tires to date.
- (7) Get total cost of batteries to date.

VI. Creation of Job of dispatcher and plans for motor vehicles operations.

- (1) Position of dispatcher will be created. Person will have responsibility for establishing procedures and necessary instructions to carry out a program for the transportation of material and personnel. Employees of the Institute or Stica who require transportation for themselves or who have material to be shipped ought to make a request on a form to be approved by the business manager or assistant business manager. This form should state the area to which transportation is requested, the date, and other information which will enable the dispatcher to designate the type of vehicle required.
- (2) It will be the duty of the dispatcher to make sure that vehicles assigned under the above procedure are the proper vehicle for the area to be visited, and that the vehicle has good tires, sufficient fuel, and in general is in good shape. Provisions should be made for extra fuel when required.

- (3) The dispatcher shall assign particular chauffeurs to certain vehicles. These chauffeurs will be generally responsible for making sure the vehicles are maintained in excellent condition.
- (4) Chauffeurs will be assigned in most cases for official trips using vehicles assigned to them.
- (5) The chauffeur will be responsible for reporting any collisions or accidents immediately to the dispatcher. The dispatcher together with the preventive maintenance section should devise rules and regulations on the reporting of collisions and accidents making sure in the cases of Servicio cars that the Instituto Nacional de Seguros is notified within the time specified under their policies. In the case of Institute cars, the procedure to be followed in the case of accidents is established in the Institute field manual. These procedures should be simplified and translated into Spanish so that all drivers of Institute vehicles are aware of the procedure to follow in case of accidents.
- (6) The dispatcher shall arrange a system for reporting kilometrage of vehicle as required by procedures established to control all official vehicles.
- (7) Check the assignment of cars to individuals. Determine condition of car periodically. Check to see that drivers adhere to a maintenance schedule; if not establish a system of disciplinary action with fixed penalties for violations.
- (8) Establish a motor pool for the central office.

VII. Plans for improvement of automobile spare parts supply and distribution system.

- (1) Move present stock of spare parts from the small storage rooms in the back of the warehouse to the office and space formerly occupied by spare parts room.
- (2) Use the windows recently opened to the garage as distribution points for handing out parts to mechanics.
- (3) Break a door between the office and the old spare parts room closing off the present door to the warehouse.
- (4) Establish an accounting system based on a revolving fund, determining the total value of parts to be maintained in stock in order to furnish normal repair and replacement services.
- (5) Establish a system of perpetual inventory.
- (6) Establish a system whereby spare parts can be ordered periodically, perhaps every three months. Leave sufficient reserve in spare parts fund for special orders.



- (7) Set up tool boards and buy the essential minimum number of tools recommended for garage use by the Willlys engineer who visited the shop.
- (8) Buy other small tools which mechanics might not have but which should be available in special jobs in order to prevent damage to vehicles as well as speed up the mechanics work through the use of proper tools for the job.
- (9) Review all used spare parts immediately when they are replaced. Make a determination with the mechanics or chief of the warehouse as to what can be salvaged. If they are to be thrown away, place them in barrels designated for this purpose.

VIII. Plans for improvement of the tire supply program and the establishment of a preventive maintenance program on tires.

- (1) Establish a sum of money to represent the total tire inventory, setting this fund as a revolving fund. In order to maintain an adequate supply of tires in the warehouse establish systems for perpetual inventory and periodic purchase orders
- (2) Establish a preventive maintenance program for vehicle tires.
  - a) Obtain material from Firestone on such a program.
  - b) Have necessary material translated into Spanish for information of drivers.
- (3) Obtain recommended pressure charts and make this information available to all mechanics and drivers preferably through some sort of educational campaign.
- (4) Number every tire and put some sort of Stica identification mark on it. Establish a program for keeping a record of every tire and for rotating tires.
- (5) Be sure that tires placed on double wheels are the same size using specifications as outlined in the Firestone pamphlet on matching duals.
- (6) When new vehicles arrive with tires unsuited for the area to which the vehicle is to be assigned change the tires before releasing the vehicle for use.

- IX. Employee Training, employee awards, and safety.
- (1) Obtain or make large charts showing: all points of vehicles which should be lubricated and how often, illustrations on adjustments and repairs which can be easily put on a diagram, etc.
  - (2) Make sure that employees who use the various machines fully understand them.
  - (3) Provide manuals on vehicle operations to all drivers and mechanics.
  - (4) Where possible have instructions on the use of machines and equipment translated into Spanish and placed near the machine.
  - (5) Establish prizes for vehicle maintenance.
  - (6) Establish a program of awards including lapel pins for good driver safety records.
  - (7) Hold fire drills periodically and train employees in the use of fire fighting equipment. Teach employees how to fight fires started from gasoline, electricity, etc.
  - (8) Establish a safety committee and accident investigation committee.
  - (9) Install safety programs for all workers and chauffeurs. Obtain training films to demonstrate how safety precautions can be profitably applied to every day work.
  - (10) Check on the possibility of using training films and visual aids during the annual conference of extension agents.

## APPENDIX "B"

SCHEDULE OF CHARGES, STICA CENTRAL GARAGE  
San Jose, Costa Rica

(The following rates cover labor costs only)

NO.	OPERATION	CHARGE
1.	Remove and replace spring assembly . . . . .	13.00
2.	Remove and replace shock absorber . . . . .	7.00
3.	Check and set camber and toe-in . . . . .	13.00
4.	Remove axles, adjust tension on king pin bearings, etc. . . . .	60.00
5.	Minor axle and wheel bearing adjustments . . . . .	20.00
6.	Adjust steering gear. . . . .	50.00
COMPLETE ENGINE OVERHAUL:		
7.	4 cylinder vehicle . . . . .	300.00
8.	6 " " . . . . .	350.00
9.	8 " " . . . . .	400.00
<p>(Includes removal of engine, recondition all cylinders, install pistons, rings and pins; rod and main bearing inserts, reface and reseal valves, check or replace timing chain or gears, recondition tappets, clean oil lines, check and replace breaker points, set timing, clean and set or replace spark plugs, test and repair electric system, paint outside of motor).</p>		
ENGINE OVERHAUL- ENGINE NOT REMOVED, BUT INCLUDES OTHER OPERATIONS LISTED ABOVE.		
10.	4 cylinder vehicle . . . . .	150.00
11.	6 " " . . . . .	175.00
12.	8 " " . . . . .	200.00
13.	Remove and replace cylinder head or gasket . . . . .	15.00
14.	Remove and replace transmission assembly . . . . .	80.00
15.	Remove and repair differential bearings or gears . . . . .	80.00
16.	Engine tune-up . . . . .	20.00
<p>(Includes clean and adjust spark plugs and distribution points, check ignition timing, test compression, tighten cylinder head, adjust carburetor, tighten fuel line connections, adjust tappets, clean fuel pump, clean air cleaner, check and adjust all wiring connections.)</p>		
17.	Brake adjustment - minor, includes shoe adjustment, add fluid, adjust hand-brake . . . . .	8.00
18.	Brake adjustment - major, includes set anchor pins, add fluid, adjust brakes . . . . .	17.00
19.	Reline and adjust brakes - light vehicles . . . . .	60.00
20.	Reline and adjust brakes - heavy vehicle . . . . .	80.00
21.	Adjust clutch pedal . . . . .	2.00
22.	Remove and replace clutch assembly (Includes removal of engine if necessary) . . . . .	75.00
23.	Lubrication - light vehicle . . . . .	4.00
24.	Lubrication - heavy vehicle . . . . .	6.00
25.	Steam wash entire vehicle . . . . .	35.00
26.	Wash vehicle . . . . .	3.00
27.	Polish and wax vehicle . . . . .	15.00
28.	Charge battery . . . . .	2.50