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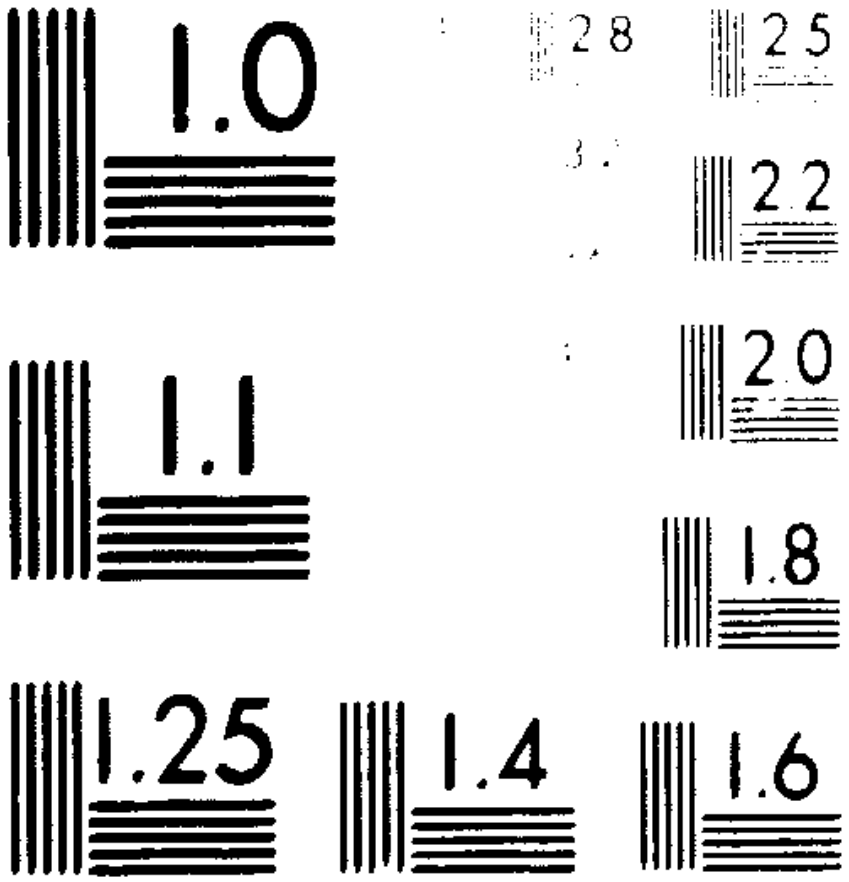

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GUYANA INDUSTRIAL CONSULTANCY UNIT

DP/GUY/79/007

GUYANA

Terminal report

Prepared for the Government of Guyana
by the United Nations Industrial Development Organisation,
executing agency for the United Nations Development Programme

Based on the work of O. Sondergaard
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United Nations Industrial Development Organisation
Vienna

003037

This report has not been cleared with the United Nations Industrial Organisation which does not, therefore, necessarily share the views presented.

TABLE OF CONTENTS

INTRODUCTION

I SUMMARY

- A. Introduction
- B. Systems development and run in Information Systems Department
- C. Development of a Job Control and Costing System
- D. Training of Information Systems Department Personnel

II. SYSTEMS DEVELOPMENT AND RUN

- A. Introduction
- B. The External and Physical Conditions
- C. Documentation
- D. Project Management

III. THE JOB CONTROL AND COSTING PROJECT

- A. Status

IV. TRAINING OF INFORMATION SYSTEMS DEPARTMENT PERSONNEL

- A. Contents of Seminars

INTRODUCTION

The Job Description for this project has the identification

DP/GUY/79/007/11-51/31.4.E

It states the purpose and duties as follows:

To assist in the establishment and operation within the Guyana State Corporation (GUYSTAC), of an internal consultancy service for its affiliated companies.

The expert is specifically expected to:

1. Analyse programmes run at the Guystac Data Centre to determine areas of improvement;
2. assist the Information Systems Department in programme development and implementation;
3. conduct seminars on efficiency in Programming and Structured Programming for GUYSTAC personnel;
4. Review the programming standards in force at the GUYSTAC Data Centre, work out the improvements and assist in their implementation;
5. assist in developing computer programmes and systems for use in the GUYSTAC Group.

In accordance with these duties, three main activities have been performed:

Task No's 1 and 4.

A general look through of the standards whereupon GUYSTAC'S Information Systems Department bases its system development, and recommendations of improvements to these standards.

Task No's 2 and 5.

Assistance in the development of a Job Control and Costing System for Guyana National Engineering Corporation.

Task No. 3.

Training of Information Systems Department personnel within several areas of programme development.

In this connection it should be mentioned, that my shipment containing teaching material and literature on Data Processing has been retained in Port of Spain for the whole period. UNDP, Georgetown were not able to perform the necessary operations to release it.

Consequently the preparation of seminars has been more time consuming than the preliminary work justified, and it has not been possible as planned to introduce and give over some translated material to the Information Systems Department.

I. SUMMARY

A. Introduction

The Information Systems Department (ISD) has previously based all system development on individual planning and programming. Recently ISD has considered a shift into the use of standard, ready made systems. One of the reasons for such a change would be a lack of experienced systems analysts and programmers.

The training as well as the recommendations in this report are however directed towards the point of having a professional staff being able to develop professional data processing systems.

B. Systems Development and Run in Information Systems Department

Throughout the project period, three man weeks were spent on the study of the principles on which the ISD bases its systems development and programmes run. Not only pure technical appraisals have been performed.

Also the all over environment has been taken into consideration when evaluating the capability of the ISD.

Recommendations are made in the following areas:

- the external and physical conditions of ISD;
- the area of documentation;
- the area of project management.

External on Physical Conditions:

1. A new building to house the ISD staff and machinery must be found, so that personnel and hardware can be given reasonable conditions.
2. It is urgent to purchase a new computer which will meet the present and future capacity needs, and which enable the ISD to keep a professional and motivated staff.
3. The relationship between ISD and its customers (the corporations) should be maintained on a commercial basis.

Documentation:

The following initiatives are recommended:

1. ISD must have the necessary equipment for reproduction (photocopying) in order to answer the significance of compilation and distribution of documentations.

2. A simple procedure for correction and distribution of documentation should be implemented.

3. A plan for the implementation of needed standards should be scheduled by the ISD Manager.

4. The following standards should be compiled:

   a. System /Programme Specification

   b. Programme/Project Documentation

   c. "Aesthetic" COBOL

   d. Documentation of Standard Made Programmes.

Project Management:

The following standards should be compiled:

   a. A recommendation on Program Design (Structured Programming)

   b. Cost Estimation

   c. Project Status

   d. Testing

   e. Security.

C. Development of a Job Control and Costing System

The objectives of development of a Job Control and Costing System have been:

- to give Guyana National Engineering Corporation a tool for better planning and follow-up on GNEC projects;
- to include some of the recommended methods presented in this report in the development of the system.

Thus it was planned to co-ordinate the [illegible]ars and the development of the GNEC system so that especially the St[illegible] Programming and the Testing could be tried in reality after the presentation in the class-room.

However, the progress of the GNEC project has been slower than expected, partly because it has not been easy to limit the system. Therefore it has been necessary to start the programming phase a little too early for the purpose of Structured Programming training.

The System/Program Specification for the system has not yet been finished. In the further steps of the project the following is recommended:

1. The System/Program Specification, is worked out in order to fit into the frames described later in this report. In that way, it might be given as a model for the standard mentioned.

2. The Program/Project Documentation worked out should as well fit into the later given frames. It might be used as an example in the standard compiled for this type of documentation.

3. Structured Programming design technique should be used with all programs, as this project is ideal for that purpose.

4 man weeks, with assistance, were spent on this system.

D. Training of Information

Systems Department

Personnel

It has never been the intention in the seminars/courses or practical project work to try and present the one and only truth about development of data processing systems. Some well tested methods have been offered in different areas. And before this project, there have been other consultants presenting their methods as well.

Therefore, besides giving some exact know-how on various subjects, it has through informal discussions in the classroom been important to emphasize that time has come for the departments personnel to make their own decision. The earlier mentioned standards on Documentation and Project Management will be a mirror of those decisions and a visible proof that the department has got an identity.

Seminars/courses have been prepared and presented on the following subjects:

1. Process Communication
2. "Aesthetical" COBOL Programming
3. File Organization
4. Testing
5. From Batch to Online Systems
6. Structured Programming.

As a consequence of the above mentioned need for the department to establish its own values, it is recommended that no foreign consultants and teachers are invited until the standards earlier listed are compiled. Thereafter further consultancies will have a foundation, and can be used constructively without causing confusion.

8 man weeks were spent with preparation and performance of seminars/courses.

II. SYSTEMS DEVELOPMENT AND RUN

A. Introduction

When you try to judge the standard of a DP- department, it is a temptation especially to consider the ability of the analysts and the programmers to perform a high utilization of the equipment. And indeed it is important, but not that important. That is why this chapter concerns proportionately little on efficiency in programming in terms of smart coding etc. It is not a main problem for the IS-department.

In brief the followirg have been key words in the evaluating of the IS-departments systems development and run.

1. The know-how in technical matters, related to the present computer equipment.
2. The quality of the systems produced, especially related to safe maintenance and to users expectations.
3. The dependency on single employees.
4. The consumption of resources.

About 50 percent of the IS-department staff have been appointed recently and therefore need a lot of training. It is too many. But the personnel still seem eager for more training and has a good background for it, if

the right stimulations are provided. Here the external and physical conditions give some problems.

The quality of the systems - in regard to users expectations - seems fair, especially when you consider the equipment. However, the users involvement and responsibility in the phase of system development as well as in the phase of production, is too diffuse and unorganised. This is a matter of documentation standards and project management.

In respect to maintenance there are some urgent needs for documentation standards. And this is directly connected to the question of dependency on single employees.

Finally there should be given some attention to the consumption of resources too. Not only for the purpose of efficiency, but also as a tool of motivation and experience. This subject is classified within project management standards.

The size of I.S.D. has been considered during elaboration of the proposed standards given in later chapters. It is unnecessary to establish large and complicated standards in the present stage of I.S.D. On the other hand, it is not reasonable to blame the staff deficiency in methods as long as these have not been documented.

B. The External and Physical Conditions

The organization plan of I.S.D. include the following groups of personnel:

- 1 Department Manager
- 1 Operations Supervisor
- 3 Systems Analysts
- 7 Programmer Analysts
- 8 Programmers
- 4 Operators
- 3 Control Clerks
- 7 Keypunch Operators

The systems analysts are supposed to supervise 2 or 3 project teams, each of which consists of 2 or 3 members. However, the department is physical divided into two sections, namely 5 persons in GUYSTAC Headquarters (the department manager included) and the rest in the Data Centre. The rooms for computer operations are placed here on the ground floor while the programmers and the programmer analysts reside on the first floor in one big room.

The DP equipment is composed of a IBM system 3 with 32 kilobytres mainstorage, 2 disc drives, 2 tape stations, 1 punch card reader/puncher and 5 punching machines.

Housing Conditions:

There is a disproportion between the well structured organization plan and the actual placing of the personnel. It is not possible to keep the department as a unity and maintain a sufficient contact between manager and staff, until all the department has been amalgamated.

Further more the computer room is too small, the air conditioning is bad, leaking water is apparent. Altogether, it is inadequate and a potential hazard. The machinery breaks down very often causing delayed production runs.

Therefore it is recommended to find as fast as possible a building which can hold all the department and which too satisfies the requirements of the hardward.

The Computer Hardward and Software:

There are several technical reasons to replace the existing computer by new equipment.

1. The computer is obsolete.

The Operating System gives very limited service to the operating staff, which means slow performance and a long turn around time. The different techniques within direct file organization are rather time consuming. And as a considerable part of the departments systems uses this type of organization it is another limiting factor.

2. The computer is too small.

That means that the programmes have to be small and inefficient. Instead of performing an all-round data processing where it is possible, you have to spread the processing within small individually runned programs.

3. The computer has no future.

Efficient and safe tools in regard to programme development, maintenance and testing will not be available on this computer. Further more any kind of jump from batch to online systems is impossible.

It is not realistic to expect that I.S.D's users will continue to be patient in regard to delayed output material from production runs - a consequence of the above listed limitations and of the earlier mentioned state of the computer room. If this situation is not rectified, the amount of user claims will escalate gradually as the systems comprise more and more end-users (e.g. the payroll system). It will be more and more difficult to convince the corporations that they are better off with the service from I.S.D. than by having their own equipment.

Finally it will be nearly impossible to keep a professional staff of programmers if nothing is changed. Quite naturally the operation supervisor has to give production runs a higher priority than test runs. But the programmers feel ignored when the bad conditions lead to days of passive waiting for computer time. Also a lack of motivation derives from the low technical ability of the computer. The continuing development of peoples ability along with the practical work seems seriously reduced.

As a result of these considerations it is recommended to purchase a new computer. Reference is given to H. Kerners report of October 11, 1981 on Implementation Plan and Schedule.

The Relationship to the Corporations:

It is the job of I.S.D. to give service in the area of data processing to the 25 GUYSTAC corporations.

Today some accounting between I.S.D. and the corporations takes place when a system is developed. But it is not a contractual relationship. This has lead to situations where a corporation - after having lost interest in a system under development - have given up the work without any financially consequences.

This is of course a waste of money. But more seriously it results i defatism among the I.S.D. staff.

It is recommended that the relationship between I.S.D. and the corporations is made in an ordinary contractual manner. The corporations will know that data processing is an investment among others, and the personnel in I.S.D. will feel more committed to the project.

See later in the section on Project Management: Cost Estimation.

C. Documentation

As long as the systems runned by I.S.D. are comparatively limited in size, the retirement of single programmers or analysts will not cause serious problems. However, the department is now involved in middle sized payroll and billing systems and it is therefore time to introduce some reasonable safeguards against dependency of single employees. Only a good and homogeneous documentation standard will provide such a safeguard.

There are three types of contributers in I.S.D. in regard to systems development.

1. Systems Analysts
2. Programmer Analysts
3. Programmers.

The systems analysts and the programmer analysts deal with the user communication and they work out the System/Programme Specification. This documentation is not given to the user obligatory. Accordance between the system development and the users expectations is mainly achieved through meetings and examples of output - material.

As for the System/Programme Specification, it is the impression that the Programme Documentation is confusing, but not chaotic.

The existing documentation compiled by the analysts and programmers indicates a good knowledge of the components of system work and an ability to realize them. But the documentation folders are private and a poor support to other persons. The user is in this connection let down. He is given no chance to give approval of the base on which the system is developed.

In the following sections there are proposals of the frames for the most urgent documentation standards. They are not intended to be used slavishly. The more experienced programmers and analysts of I.S.D. should be the actual writers. They know the departments machinery and type of systems, and they have been exposed to several useful standards in later years. Only if the standards are founded in the department itself they will take root.

It is recommended that the following is performed in regard to compilation of standards:

1. It should be decided that for a period of 6 months internal work has a higher priority than external work.
2. The priority in which the different standards will be compiled is set up.
3. A programmer or an analyst is made responsible for compilation of a given standard. The date of the first edition should be fixed.

4. The writer himself, the Department Manager and 1-2 persons working in "opposite" areas perform Structured Walk Through (see Project Management, Testing) on the first edition.
5. The finally agreed standard is distributed.

Reproduction and Distribution:

For a written standard to be useful it must be regarded as a handbook by each involved person. And if the handbook is to be kept up to date, there must be a procedure for maintenance.

The same passes for the documentation compiled as a result of those standards. The System/Programme Specification and the Programme Documentation should be distributed as well as corrected when necessary.

The following is recommended:

1. A simple procedure for correction of documentation should be implemented. That involves
   - a distribution paper naming the persons to whom corrections must be distributed to. This paper is the first page in the documentation;
   - a correction paper naming the pages which either are added, replaced or deleted. This paper is the front page in an edition of corrections.

Proposed layouts for these papers has been given separately to I.S.D. (app. 1 and 2).

2. Purchase of some copy-equipment as a part of the hardware needed to run a DP- department professionally.

System/Programme Specification:

The objectives of the System/Program Specification are:

- to bring the user in a position whereby he can understand and hereafter either approve or reject the system described - before programming takes place;
- to bring the programmers in a position whereby he can transform the description into programmes with minimum risks of misunderstandings;
- to be used as a medium when handing over projects between analysts and between programmers.

It is therefore recommended that a System/Programme Specifications as a standard should be organized as follows:

1. The total system is divided into main routines. The users functions might be one main routine, the functions inside the DP- system might be another.
2. Main Routine Descriptions are compiled with the following contents:
   a. The Objectives of the main routine.

b. The System Diagram.

c. The Descriptio :

- an outline of the problems of th: main routine;
- a presentation of important terms, expressions and consepts.

d. The Routines (programmes) of which the main routine is constituted, named.

3. Routine Descriptions are compiled with the following contents:

a. The Objectives of the routine.

b. The Frequency of which the routine is entered.

c. Input and Output files for the routine.

d. The Descriptions

- an outline of the problems of the routine;
- the routine is divided into procedures (e.g) handling a certain transaction type or record type);
- each procedure consists of a number of rules (or precepts) handling single fields in single records. All reference to single fields should be as follows:

DATA-ABBREVIATION (data-name)

in order to make it readable for programmers and users (see article 5: Data Description).

e. Layouts of reports, data-entry sheets etc.

4. File Descriptions are compiled with the following contents:

a. A list of files (file name) used in the system.

b. A list of record types (record name) for each file.

A proposed layout for this list has been given separately to I.S.D. (app. 3)

c. A list of data fields (DATA-ABBREVIATION) for each record type. A proposal layout for this list has been given separately to I.S.D. (app. 4).

5. Data Descriptions are compiled, one page for each data ordered alphabetically, with the following contents:

a. The Data Name.

b. The Abbreviated Data Name.

c. The Definition of the data.

d. The Set of Values for the data.

e. Separate Comments on the data.

Proposed layout for this form has been given separately to I.S.D. (app. 5).

It is recommended that a minor example of a System/Program Specification become part of the compiled standard.

The user should always be given the benefit of a discussion prior to his reading the System/Program Specification. His approval should be given in writing before the programming phase is entered.

Programme/Project Documentation:

The objectives of the Programme/Project Documentation are:

- to establish an internal tool for project management;

- to provide an internal system documentation on programme technical matters.

It is therefore recommended that a Programme/Project Documentation as a standard should be organized as follows:

1. Cost Estimates, see Project Management: Cost Estimation.
2. State of Activities, see Project Management: Cost Estimation.
3. Security, see Project Management: Security.
4. Test plan, see Project Management: Testing.
5. Record Layouts. Here and only here all record layouts for the system are placed. A proposal to some more handy layout forms than the present used, has been given separately to I.S.D. (app. 6, 7 and 8).
6. Copy Areas, their names and reproduction. It is recommended, that copy areas are used more frequently than present, as it will provide more simple and safe programming.
7. A chapter for each program with the following contents:
   a. The SP- programme structure with allocations of operations, see Project Management: Programme Design.
   b. Further Comments and Explanations if it is necessary.
8. Project Status, see Project Management: Project Status.

It is recommended that a minor example of a Programme/Project Documentation become part of the compiled standard.

"Aesthetic" COBOL:

Looking through a number of COBOL - programs developed in I.S.D. it has been found, that the programs differ too much from each other in regard to their outward manifestation.

Most of the programmers are familiar with the principles on "aesthetic" COBOL, as seminars have been given on the subject. It has been pointed out that it is more important to create easily read programs than to produce smart and efficient code.

It is recommended to walk through the present material on "aesthetic" COBOL in order to raise it as a written standard.

Taking the efficiency of programmes into account, two areas should be considered.

Apparently an informal standard has arised in I.S.D. saying that master files nearly always must be index sequential organized (direct). It might be a good solution in many cases. But as it is a rather time consuming technique as well, other methods (pure sequential processing) should be considered in the design phase on coming systems.

Another practice which reduces through-put performance is the use of the printer as a direct writeble media. All programs write immediately on the printer. Establishment of a spooling system is judged to improve the through-put with at least 25%.

Standard Programmes:

The more systems a computer department develops, the more individual programs or modules are produced, which can be used by later coming systems for their own purpose. These programmes are called Standard Programmes.

I.S.D. has in the same way brought forth some Standard Programmes, but no systematically documentation has been introduced. Consequently it is doubtful if all programmers are aware of their existence. And the incentive to work out general products is diminished.

It is therefore recommended that a handbook on Standard Programs is founded. It might have the following contents:

1. An Index ordered by type of program (date-handling, bit-handling, security etc.) and programme name.

2. A Program Description on each programme or module including the following key words:

   a. Programme Name.

   b. The Objectives of the programme.

   c. Call of programme.

   d. Arguments or Parameters, a detailed description on each.

   e. Responsible Programmer.

D. Project Management

Most projects in I.S.D. have been comparatively small 1 or 2 man projects. Problems in regard to co-ordination inside the project have therefore been minimal. Verbal communication has been a central part of the project management.

This non formalized follow up seems to have had positive results in the point of getting problems discussed. A relaxed relationship between manager and staff and a weekly meeting with the project leaders has backed this process.

Follow up of resources used by the different projects will - when compared with earlier estimates - indicate those areas where more inputs are needed. A formalized follow up is also more binding as well for the project and for the management.

This require the establishment of cost estimates standard, an issue which also concerns the earlier mentioned proposal on a more contractual relationship with clients.

Certain areas on system development influence the quality of the system in particular. This applies for program design, testing and security. Those subjects deserves establishment of separate standards, closely related to project management.

Program Design:

Program Design is not - in contrast to question on documentation - a serious problem for I.S.D. The programs are comparatively small, which means that troubles in direction of a comprehensive view are few. The traditional principle on modularized programming has been used.

But two points gives favour of introducing the concept of Structured Programming (SP) in I.S.D.

1. SP provides partly a solution on the problems of documentation.
2. SP is a good foundation for a department, which is expected to start up bigger and more complicated systems in few years.

SP is a well described method how to build up a program design in correspondence with the nature of the problem. The strength of the method is that it shows up errors in the overview, and it results in readable documentation on the program structure. This documentation replaces the hitherto used programme flow chart, and it should be a part of the internal programme documentation (see chapter Documentation: Programme/Project Documentation). Together with the programme list it should be the entire documentation compiled by the programmers.

It is therefore recommended:

1. To purchase the book "Principle of Program Design" written by Michael Jackson.

2. On basis of this book and of the material handed over through the course "Structured Programming", to set down the principles of the method in a recommended standard.

SP is a rather demanding method in regard to logic and dicipline. A programmer, accustomed to evade a missing comprehension by use of spaghetti code, might feel quite lost at first. Therefore it is recommended to give encouragement through establishing of Structured Walk Through on the first attempts (see Testing later this chapter).

Cost Estimation:

It has already been stated:

- that I.S.D. do not keep a consequently contractly relationship to its users based on a cost estimate;
- that I.S.D. do not keep track on actual used resources in connection with system development;
- that it might lead to a declined respect from the users on system work;
- that an indicator is required to signal when a project is moving out of control.

Experience has shown that it is troublesome to estimate costs on system work. Therefore a system for cost measuring should not be used as an introduction to piece work. Instead it should provide users as well

as staff the feeling that system work is a chosen investment among other investments. And it should be used as an indicator on where to make an effort in the urge for professionalism.

The principle on cost measuring must be as simple as possible, taking the size of the department into account.

Introduction of two standard prices is recommended:

1. Analysing Hour, covering analysing and overhead.
2. Programming Hour, covering programming, machine runs and overhead.

In connection with development of new systems or considerable corrections the following principles in accounting are recommended:

1. Preliminary feasibility studies are worked out free.
2. Then cost estimates on the compilation of the System/Programme Specification is worked out. It should be shown here how many analysing hours each routine will consume.
3. If the user accepts the offer (in writing) the System/Programme Specification is compiled.
4. The System/Programme Specification is presented to the user together with cost estimates on programming the system. It should be specified for each routine how many programming hours has been estimated.

Further more it should be named how many analysing and programming hours estimated for tests (experience says it is 30-50% of the total costs).

5. If user accepts the offer and the contents of the System/Programme Specification, then programming is started up.

Getting the actual costs registered is a task of dicipline. The following is recommended:

1. The cost estimates are transformed into a "State of Activity" form. A proposal to layout for this form has been given separately to I.S.D. in four different versions (app. 9, 10, 11 and 12).

2. It is the duty of the project leader to update the "State of Activity" with actual used man hours.

3. It is the duty of the project members to report on a weekly basis the time used on the different routines.

Finally it is recommended to take into consideration, that the Job Costing System could be a useful tool to I.S.D. itself. By reporting the estimates as well as the actuals it might provide a comprehensive view on tasks in progress.

Project Status:

The weekly meeting in I.S.D. between manager and project leaders is a very good institution in regard to exchange of experience and general information. But more serious problems might not always be presented in a bigger forum. And project leaders are seldom eager to arrange status meetings themselves. That can lead to "suddenly" arised insoluble knots.

The following is recommended:

1. The project status, compiled by each project leader within certain intervals, should have the following contents by standard:
   a. Status on analysing for each routine.
   b. Status on programming for each routine.
   c. The "State of Activity" up-dated.
   d. A revised "State of Activity" if necessary.
2. The status is given to manager and project members.

Testing:

The documentation on test is kept by I.S.D.'s programmers in their Programme Documentation. Though only the result (e.g. a report) of the test run is kept. Therefore it is not possible to state whether or not the programs are properly tested and this become in itself a problem.

The only way you can ensure that the test is a result of reasonable decisions is by presenting those decisions in the project management documentation.

As stated in the given course on testing, it is recommended that I.S.D. establish a test standard covering the following:

1. A definition of those hierarchal elements, of which a test consists (test-area, test-generation, test-version, test-unit, test-situation).
2. A definition of the test methods, of which I.S.D. will rely on (e.g. desk-test, program reading, module test etc.).
3. A standard of the test-plan, placed in the Programme/Project Documentation:
   a. Dividing the test into areas.
   b. Dividing the areas into generations, naming what is to be tested where.
   c. For each generation is listed which files should be printed how.
   d. A "State of Activity" plan on the testing.
4. Establishment of a Test Survey form in order to force some system into the compilation of test material. Proposed layout for a Test Survey has been given separately to I.S.D. (app. 13).

5. Establishment of an Error Report form. It will produce a documented connection between the users or analysts error reporting and the corresponding correction by the programmer. A proposed layout for an Error Report form has been given separately to I.S.D. (app. 14).

During the test course a test method named Structured Walk Through (SWT) has been presented and documentised too. SWT is a systematic test method which might be used with any type of DP work. Especially SWT is good when a person for the first time produces something in a certain way. It is good also when you are going to introduce standards, which to be valuable require wide acceptance.

SWT is administrated by the producer of the object material. He selects the persons with whom he wants to walk through the material. Before hand a general check list on the type of material (Program Specification, Program list etc.) must be present. It is team work and in most cases without participation of the manager. Feed back is given to the producer in a structured way.

It is recommended that SWT is introduced formally as a test method among others. It will be efficient in a department like I.S.D's characterized by comparatively many "new" persons. SWT encourages interest in work done and forces people to get a verbal responce through discussion.

In connection with the implementation of standards it is recommended to establish a check list on requirements to their documentation (index, language, examples etc.). This might be the basis on which first edition standards are evaluated.

Security:

The very idea in looking at a system from a security point of view, is to measure the effort done to guarantee integrity.

To keep the integrity it is important:

- to make sure that the right programme versions are used within the production runs;
- to make sure that neither programme errors nor system errors (software or hardware) lead to missing/multiple handling of records;
- to make sure that the right files are used within the production runs;
- to make sure as far as possible that the informations within the master records are correct.

The first three of the above statements are connected to production runs. By manual or machinal efforts it should be controlled that the components of the runs (programmes and files) are the right ones. And the responsibility for checking this belongs to the DP operating staff entirely.

There is no written standard in I.S.D. on handling security matters.

It is recommended to introduce a minimum standard on security as follows:

1. All main programmes should display their catalogued programme name and last date of compilation at the operator console.

2. All registers and intermediate files should end up with an End-Of-File record containing the total number of records. It is then the duty of the programmers to create (sequential files) or update (index-sequential files) this record in accordance with a given layout.

3. All programmes terminate the run by displaying the following at the operator console:

   a. For sequential input files: number of read records/ number of records stated in EOF-record.

   b. For sequential output files: number of created records.

   c. For index-sequential updated files: number of new records/ number of changed records/number of deleted records/the net movement.

4. Proposed layout for the above mentioned record summary has been given separately to I.S.D. (app. 15). Eventually, a standard programme for displaying this summary could be developed and documented in the handbook for standard programmes.

5. It is the operator staff's duty - in basis of specifications (written) from the programmers - to check the programme versions as well as the record summaries.

The question of making sure that the information registered is correct, is connected to the question of how closely data is checked prior to registration.

It is recommended more frequently to use "advise" as a part of the feed back to the user when registers are up-dated. Advise does not reject the actual up-dating, but it asks the user to take a closer look on a certain item. For instance it is reasonable to advise if some reported amount of money (salary, allowance etc.) exceeds a reasonable figure.

III. THE JOB CONTROL AND COSTING SYSTEM

A. Status

Status on Analysing:

The following routines have been compiled, but not verified by the user:

- 10 - 10 Sorting the Transaction File
- 10 - 15 Job File Up-dating

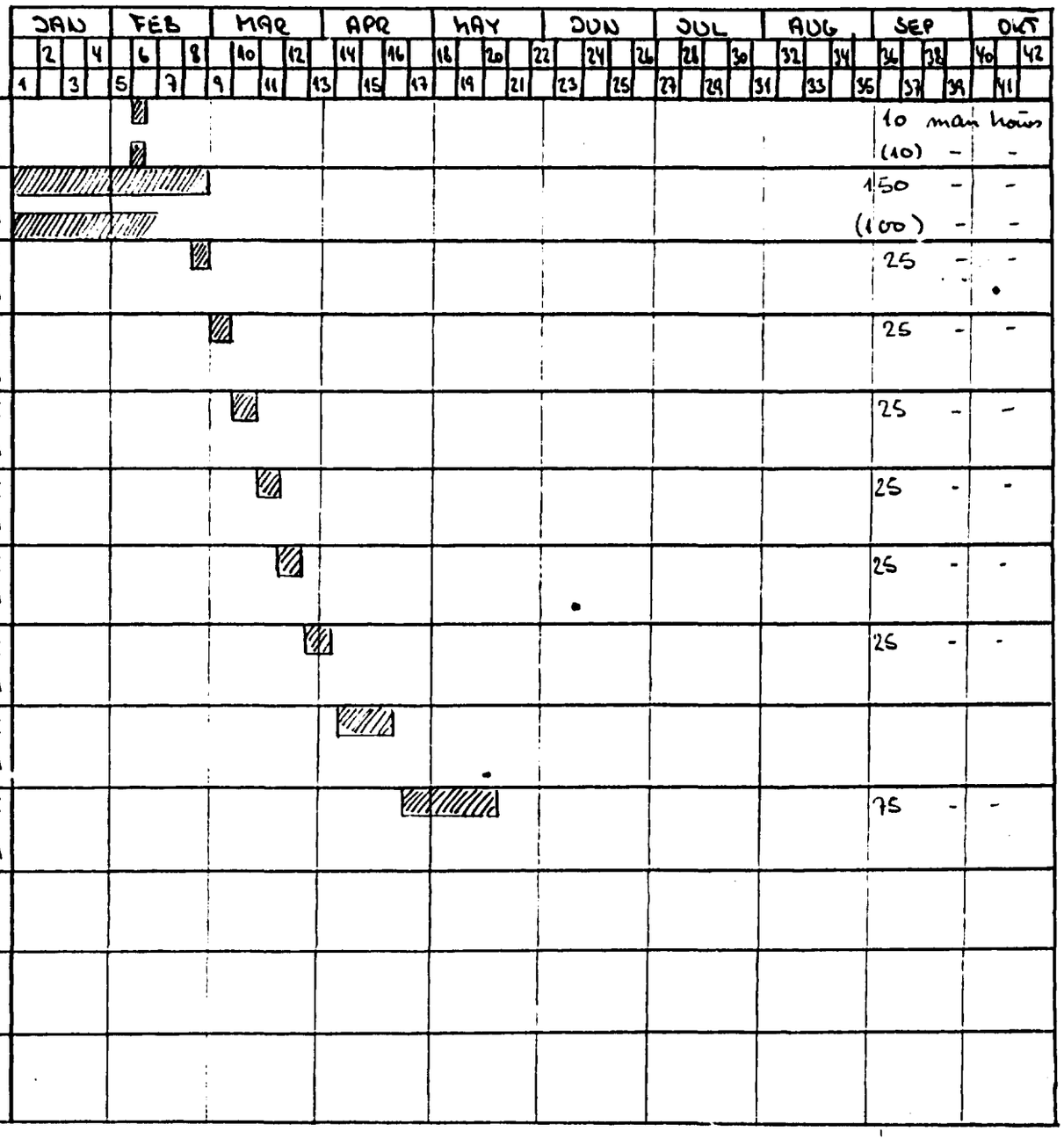
For the following routines report layout has been worked out:

- 10 - 15 Job File Up-date Check List
- 10 - 30 Schedule of All Work Orders
- 10 - 36 Work in Progress by Section
- 10 - 40 Summary of Finished Work
- 10 - 46 Completed Work Orders by Sections

Status on Programming:

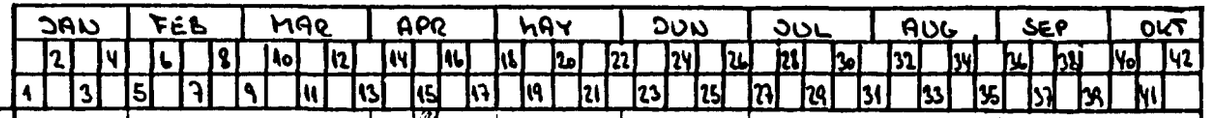
Compilation of program design has been finished on the most complicated routine 10 - 15: Job File Up-dating. The presented technique in Structured Programming has been used.

Status of Activity on Analysing



10 - 10	Sorting the Trans. file	E	10 man hours		
		A	(10)	-	-
10 - 15	Job File Up-dating	E	150	-	-
		A	(100)	-	-
10 - 30	Schedule of All Work Orders	E	25	-	-
		A			
10 - 35	Retrieve of Work in Progress	E	25	-	-
		A			
10 - 36	Work in Progress by Section	E	25	-	-
		A			
10 - 40	Summary of Finished Work	E	25	-	-
		A			
10 - 45	Retrieve of Completed Work	E	25	-	-
		A			
10 - 46	Completed Work by Section	E	25	-	-
		A			
	User Acceptance	E			
		A			
	Test Planning	E	75	-	-
		A			

Status of Activities on Programming



10 - 10	Sorting the Trans. File	E A	10 man hours		
10 - 15	Job File Up-dating	E A	175 (75)	- -	- -
10 - 30	Schedule of All Work Orders	E A	50	-	-
10 - 35	Retrieve of Work in Progress	E A	60	-	-
10 - 36	Sorting Work in Progress	E A	10	-	-
10 - 37	Work in Progress by Section	E A	50	-	-
10 - 40	Summary of Finished Work	E A	75	-	-
10 - 45	Retrieve of Completed Work	E A	50	-	-
10 - 46	Sorting Completed Work	E A	10	-	-
10 - 47	Completed Work by Section	E A	50	-	-
	Test	E A	200	-	-

IV. TRAINING OF IS-DEPARTMENT PERSONNEL

A. Contents of Seminars

Process Communication:

The objectives of this seminar was:

- to present a concept on the internal communication of a computer;
- to change the understanding of the computer from being a matter of the compiler to be a matter of the monitor;
- to present the consultant to programmers and analysts.

No written material was handed over. The seminar lasted half a day and 19 persons participated.

"Aesthetical" COBOL programming:

The objectives of this seminar was:

- to stress the difference between easily read and efficient COBOL programming and to give a clear priority on these;
- to go through the traditional rules of aesthetical COBOL;
- to point out some COBOL statements which can lead to a lot of confusion if misused.

Documentation on 3 pages has been handed over. It consists of:

1. A short and precise example of a nice looking data division in COBOL.

2. A short and precise example of a nice looking procedure division in COBOL.

The seminar lasted half a day and 13 persons participated.

File Organisation:

The objectives of this seminar was

- to go through the principles of the different types of file organization connected to I.S.D's equipment;
- to discuss which methods should be used when;
- to give some indication on what can be expected in regard to file organization when/if I.S.D. has been given new equipment.

Documentation on 7 pages has been handed over. It consists of:

1. An explanation of the relationship between specific COBOL statements and different access methods.

2. Illustrations on the connection between the logical concepts of different file organizations and the physical hardware technique.

3. Illustrations on the facilities of each of the file organizations.

The seminar lasted two half days and 16 persons participated.

Testing (work shop):

The objectives of this seminar were:

- to make the participants creative in partaking in the planning of a test;
- to make the participants aware of different test methods;
- to make the participants able to fill out the post as a project member while a system is in the phase of testing.

Documentation on 19 pages has been handed over. It consists of:

1. Basic words and expressions on test.
2. Definition on different test methods.
3. Detailed description of the test method Structured Walk Through.
4. A model of a test plan.

The seminar lasted two half days and 19 persons participated.

From Batch to Online Systems (work shop):

The objectives of this seminar were:

- to make the participants to understand the principal differences between a batch and an online system;
- to explain the basic elements in an online system.

Documentation on 11 pages has been handed over. It consists of:

1. Basic words and expressions on online systems.
2. Illustration on a configuration for an online system; and a corresponding communication - play.
3. Illustration on the technique generally used in communication with video terminals.

The seminar lasted three half days and 15 persons participated.

Structured Programming (work shop):

The objectives of this seminar were:

- to make the participants able to design programmes in a structured way.

Documentation on 65 pages has been handed over. It consists of:

1. Practical illustrations of how to go through all phases.
2. Basic rules.

The seminar lasted 9 days and 25 persons participated (3 persons from Bank of Guyana).

DISTRIBUTION

PROJECT-NUMBER	DATE	EDITION	PAGE
NAME OF PROJECT			TYPE OF DOCUMENT
NAME OF USER-PROJECTLEADER AND ADDRESS			
NAME OF DP-PROJECTLEADER			

NAMES OF RECEIVERS	AMOUNT

Agg. 2

CORRECTIONS

PROJECT-NUMBER	DATE		PAGE
NAME OF PROJECT			TYPE OF DOCUMENT
			EDITION OF CORRECTIONS
			NUMBER OF PAGES INCL. THIS PAGE

THE FOLLOWING PAGES EITHER ARE ADDED (A), CHANGED (C) OR REMOVED (R):

ex:

Chapter 4.1 page 3-5 (A)
- 6.0 - 17 (C)

App. 3

I/S DATACENTRALEN AF 1959

FILINDHOLD

CONTENTS OF FILE

Opgavenr	Udgivelses- eller rettelsesdato	Udgave	Sidenr
PROJECT-NUMBER	DATE	EDITION	PAGE

Filnavn: FILENAME	Filnr: FILE-NUMBER
Leverandører (evt. hrut/rut hvori filen dannes): THE MAINROUTINE/ROUTINE IN WHICH IT IS CREATED	Filens art (sæt x): 1. fra edb til bruger
Modtagere (evt. hrut/rut hvori filen benyttes): THE MAINROUTINES/ROUTINES TO WHICH IT ARRIVES	2. fra edb til omverdenen
Medium: MEDIUM / Frekvens (anvendelse, levering): FREQUENCY OF USE	3. fra bruger til edb
Organisation (for registre): FILE-ORGANIZATION / Opdateringsfrekvens (for registre): FREQUENCY OF UPDATING	4. fra bruger til omverdenen
Henvisning til back-up fil: BACK-UP FILE? / Filens størrelse (min./max. antal tegn): THE SIZE OF THE FILE	5. fra omverdenen til edb
Antal individer/sider i alt: AMOUNT OF RECORDS / Antal eks.	6. fra omverdenen til bruger
Leveringstidspunkt/svartid/tilgangstid	7. edb-register
Bemærkninger: REMARKS	8. brugerregister
	9. intern edb-fil
	10. intern bruger-fil

~~INDHOLD:~~ ☐ ~~individer eller~~ ☐ ~~data i filen (sæt x)~~

	SK	Navn (individnavn, datanavn) NAME OF RECORDS	NR REC. NO.	Bemærkninger (evt. længde og udseende) REMARKS (NAME ABBREVIATED)
1				
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DC 1124 PL 11-74

SK: Sorteringskriterium

Appr. 4

I/S DATACENTRALEN AF 1959

INDIVIDINDHOLD

CONTENTS OF RECORD

Opgavenr	Udgivelses- eller rettelsesdato	Udgave	Sidenr
PROJECT-NUMBER	DATE	EDITION	PAGE

Filnavn	Filnr
FILENAME (NAME ABBREVIATED)	FILE-NUMBER

Individnavn	Individnr
RECORDNAME	RECORD-NUMBER

Antal individer	Individstørrelse (min./max. antal tegn)
AMOUNT OF RECORDS	SIZE OF RECORD (MIN/MAX)

Bemærkninger: REMARKS

INDHOLD: data i individet

	SK	i SL: Datanavn / i PG: Dataforkortelse	Feltudseende	NR	Bemærkninger (i SL: fx længde og udseende) (i PG: fx eksempel)
1		DATANAME ABBREVIATED	PICTURE OF FIELD		REMARKS
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18	SORTING - CRITERION				
19					
20					
21					
22					
23					
24					

DC 1125 PL 3-72

SK: Sorteringskriterium

Bemærkninger

REMARKS

Dataopbygning (1 pos. = 1 tegn)

CONSTRUCTION OF DATA (1 POSITION = 1 CHARACTER)

DC 1017 PL 2.72

Appx. 5

I/S DATACENTRALEN AF 1959

DATABESKRIVELSE

DESCRIPTION OF DATA

Opgavenr	Udgivelses- eller rettelsesdato	Udgave			
PROJECT-NUMBER	DATE	EDITION			
Datanavn			**Fortegn**	**Maxtegn**	**Dataforkortelse**
DATANAME (FULL)			+/-		DATA-ABBREVIATION

Definition

DEFINITION

Værdimængde

SET OF VALUES

I/S DATACENTRALEN AF 1959

INDIVIDSTRUKTUR
RECORD LAYOUT

Opgavenr	Udgivelses- eller rettelsesdato	Udgave	Sidenr
PROJECT-NUMBER	DATE	EDITION	PAGE

Filnavn	Filnr
FILENAME	FILENUMBER

Individnavn	Individnr
RECORDNAME	RECORDNUMBER

	Individstørrelse (min./max. antal bytes)
	RECORDSIZE (MIN/MAX)

Bemærkninger: REMARKS

SK: Sorteringskriterium
R : Repræsentation (B = Binær, H = Hexadecimal, P = Pakket, A = Alfamerisk, F = Flydende komma)
K : Konstant

Ved binære konstanter tilføjes H eller D til repræsentationen afhængig af om konstanten er angivet hexadecimalt eller decimalt (BH, BD)

R	1	5	9	13	17	21	25	29	33	37
K										

SK: SORT CRITERIUM
R: REPRESENTATION (B = BINARY, H = HEXADECIMAL, P = PACKED, A = ALFANUMERICK, F = FLOATING POINT)
K: CONSTANT
TO BINARY CONSTANTS IS 'H' OR 'D' ADDED TO THE 'B' INDICATING IF THE CONSTANT IS GIVEN DECIMAL OR HEXADECIMAL (BD, BH).

SK

R	41	45	49	53	57	61	65	69	73	77
K										

SK

R	81	85	89	93	97	101	105	109	113	117
K										

SK

R	121	125	129	133	137	141	145	149	153	157
K										

SK

DC 1170 PL 3-74

DC 1042 PL 4-77

Fil			Filnr		Alfabet	Opbevaringsperiode
FILENAME			FILENUMBER		ALPHABET (EBCDIC)	RETENTIONPERIOD
Blokning/bloklængde	Post-/individformat	Organisation	Tæthed	Spor	Bemærkning/henvisning	
BLOCK LENGTH	FORMAT	FILE ORG.	DENSITY	TRACKS	REMARKS	

POST-/INDIVIDFORMAT: F = Fast, V = Variabel, U = Uspecificeret F = FIXED, V = VARIABLE, U = UNDEFINED

ORGANISATION: SEK = Sekventiel, ISEK = Indekseret sekventiel, DIR = Direkte, REL = Relativ, TELE = Telekommunikation.

SEK = SEQUENTIAL, ISEK = INDEX SEQ., DIR = DIRECT, REL = RELATIVE, TELE = TEL. COM.

	1	5	9	13	17	21	25	29	33	37	41	45	
R													R
P													P
A													A
SK													

	49	53	57	61	65	69	73	77	81	85	89	93	
R	1	5	9	13	17	21	25	29	33	37	41	45	R
P													P
A													A
SK													

	97	101	105	109	113	117	121	125	129	133	137	141	
R	1	5	9	13	17	21	25	29	33	37	41	45	R
P													P
A													A
SK													

R: Repræsentation (B = Binær, P = Pakket, A = Alfamerisk, F = Flydende komma).

R: REPRESENTATION (B = BINARY, P = PACKED, F = FLOATING POINT)

I/S DATACENTRALEN AF 1959

POST-/INDIVIDSTRUKTUR

RECORD LAYOUT

Opgavenr: PROJECT-NUMBER

Udgivelses- eller rettelsesdato: DATE

Udgave: EDITION

Sidenr: PAGE

Post-/individnavn:

Appg. 7

I/S DATACENTRALEN AF 1959

App. 8

HULKORTSTRUKTUR

LAYOUT FOR PUNCHCARD

Opgavenr	Udgivelses- eller rettelsesdato	Udgave	Sidenr
PROJECT-NUMBER	DATE	EDITION	PAGE

Filnavn	Filnr
FILENAME	FILENUMBER

K = CONSTANT FK = FIELD REQUIREMENT SK = SORT CRITERIUM
K = Konstant FK = Feltkrav SK = Sorteringskriterium

Individnavn	Individnr
RECORDNAME	RECORDNUMBER

Bemærkninger: REMARKS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
K																																									
FK																																								
SK																																								

	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
K																																								
FK																																								
SK																																								

Individnavn	Individnr

Bemærkninger:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
K																																								
FK																																								
SK																																								

	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
K																																								
FK																																								
SK																																								

DC 1169 PL 3-74

I/S DATACENTRALEN AF 1959

STATE OF ACTIVITIES

AKTIVITETSSTATUS

FORDELING:
DISTRIBUTION:

Gruppe	Måned MONTH
GROUP	WEEK Uge nr

Aktivitetsnr	Aktivitetsbenævnelse	Init./P.nr
ACTIVITY NUMBER	ACTIVITY NAME	INI-TI-ALS

Opgavenr PROJECT-NUMBER
Emne TASK
Udgivelses- eller rettelsesdato DATE
Udgave EDITION
Sidenr PAGE 9

Bemærknings-henvisning
REF. TO REMARKS

DC 1098 PR 6-72

I/S DATACENTRALEN AF 1959

MAIN TIMESCHEDULE
MAIN RESSOURCE PLAN

☐ HOVEDTIDSPLAN
☐ HOVEDRESSOURCEPLAN

Projektnr	Projektnavn	Udgivelses-, rettelses- eller mødedato	Udgave	Side nr.
PROJECTNUMBER	PROJECTNAME	DATE	EDITION	PAGE

Emne	Usikkerheds %	Fravigelses %	Udarbejdet af
TOPIC	PERCENT OF PRECAUTION	PERCENT OF DEVIATION	WORKED OUT BY

Fasenavne/Hovedaktivitetsnavne Fasenavne/Enhedsnavne	Aktivitets nr. Enheds nr.	År: YEAR Måned: MONTH	Antal enheder ialt
NAME OF PHASE/ NAME OF MAIN ACTIVITY	ACTIVITY NUMBER		TOTAL NUMBER OF ITEMS
NAME OF PHASE/ NAME OF ITEM	ITEM NUMBER		

DC 1207 SD 12-80

PAGE - 10

I/S DATACENTRALEN AF 1959

PHASE TIMESCHEDULE ☐ FASETIDSPLAN

PHASE RESSOURCE PLAN ☐ FASERESSOURCEPLAN

Projektnr.	Projektnavn	Udgivelses-, rettelses- eller mødedato	Udgave	Sidenr.
PROJECTNUMBER	PROJECTNAME	DATE	EDITION	PAGE

Fasenavn			Usikkerheds %	Fravigelses %	Udarbejdet af
NAME OF PHASE			PERCENT OF PRECAUTION	PERCENT OF DEVIATION	WORKED OUT BY

Hovedaktiviteter/Aktiviteter	Aktivitets nr.	År YEAR / Måned MONTH	Antal enheder ialt
MAIN ACTIVITY/ACTIVITY	ACTIVITY NUMBER		TOTAL NUMBER OF ITEMS

DC 1208 SD 12 - 80

I/S DATACENTRALEN AF 1959

DETAILED TIMESCEDULE
DETAILED RESSOURCE PLAN

☐ DETAILTIDSPLAN
☐ DETAILRESSOURCEPLAN

Projektnr.	Projektnavn	Udgivelses-, rettelses- eller mødedato	Udgave	Sidenr.
PROJECTNUMBER	PROJECTNAME	DATE	EDITION	PAGE

Fasenavn			Usikkerheds %	Fravigelses %	Udarbejdet af
NAME OF PHASE			PERCENT OF PRECAUTION	PERCENT OF DEVIATION	WORKED OUT BY

Aktiviteter/Bemanding Aktiviteter	Init./Pnr.	Aktivitets nr. Aktivitets nr.	År: YEAR Måned: MONTH Uge nr.: WEEK	Antal enheder ialt
ACTIVITY / CREW ACTIVITY	INI-TIALS	ACTIVITY NUMBER		TOTAL NUMBER OF ITEMS

DC 1209 SD 12 · 80

I/S DATACENTRALEN
AF 1959

TESTOVERSIGT
TEST SURVEY

Opgavenr	Udfyldelsesdato	Rev. dato	Testoversigt (betegnelse)	Testfase	Banenr	Ark. nr.
PROJECT-NUMBER	DATE		TEST AREA	GEN.		PAGE

Input · Output · Register · Automatik

INPUT SITUATIONS
OUTPUT SITUATIONS

TEST-ITEM

Identifikation af testenheder

Situationstabelnr

1	
2	
3	
4	
5	
6	
7	
8	
9	
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11	
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13	
14	
15	
16	
17	
18	
19	
20	

ARK. NR.

DC 1028 PL 4-72

App. 14

ERROR - REPORT

PROJECT-NUMBER	DATE		PAGE
TEST: AREA GENERATION VERSION ITEM SITUATION		PRODUCTION:	
DESCRIPTION OF ERROR			
		REPORTED BY	
DESCRIPTION OF PERFORMED CORRECTIONS			
		CORRECTED BY	
ACCEPTED BY		DATE	

DATE: [ ] TIME: [ ] SUMMERY LIST FOR [ ] PROGRAM

NAME OF FILE	AMOUNT OF REC. READ	AMOUNT OF REC. STATED	AMOUNT OF NEW REC.	AMOUNT OF CHANGED REC.	AMOUNT OF DEL. REC.	NETTO MOVEM. OF REC.

I/S DATACENTRALEN AF 1959

App. 3

FILINDHOLD

CONTENTS OF FILE

Opgavenr	Udgivelses- eller rettelsesdato	Udgave		Sidenr
PROJECT-NUMBER	DATE	EDITION		PAGE

Filnavn	Filnr
FILENAME	FILE-NUMBER

Leveranderer (evt. hrut/rut hvori filen dannes): THE MAINROUTINE/ROUTINE IN WHICH IT IS CREATED	Filens art (sæt x): 1. fra edb til bruger
Modtagere (evt. hrut/rut hvori filen benyttes): THE MAINROUTINES/ROUTINES TO WHICH IT ARRIVES	2. fra edb til omverdenen
Medium: MEDIUM; Frekvens (anvendelse, levering): FREQUENCY OF USE	3. fra bruger til edb
Organisation (for registre): FILE-ORGANIZATION; Opdateringsfrekvens (for registre): FREQUENCY OF UPDATING	4. fra bruger til omverdenen
Henvisning til back-up fil: BACK-UP FILE?; Filens størrelse (min./max. antal tegn): THE SIZE OF THE FILE	5. fra omverdenen til edb
Antal individer/sider i alt: AMOUNT OF RECORDS; Antal eks.	6. fra omverdenen til bruger
Leveringstidspunkt/svartid/tilgangstid	7. edb-register
Bemærkninger: REMARKS	8. brugerregister
	9. intern edb-fil
	10. intern bruger-fil

~~INDHOLD: ☐ individer eller ☐ data i filen (sæt x)~~

	SK	Navn (individnavn, datanavn) NAME OF RECORDS	NR REC. NO.	Bemærkninger (evt. længde og udseende) REMARKS (NAME ABBREVIATED)
1				
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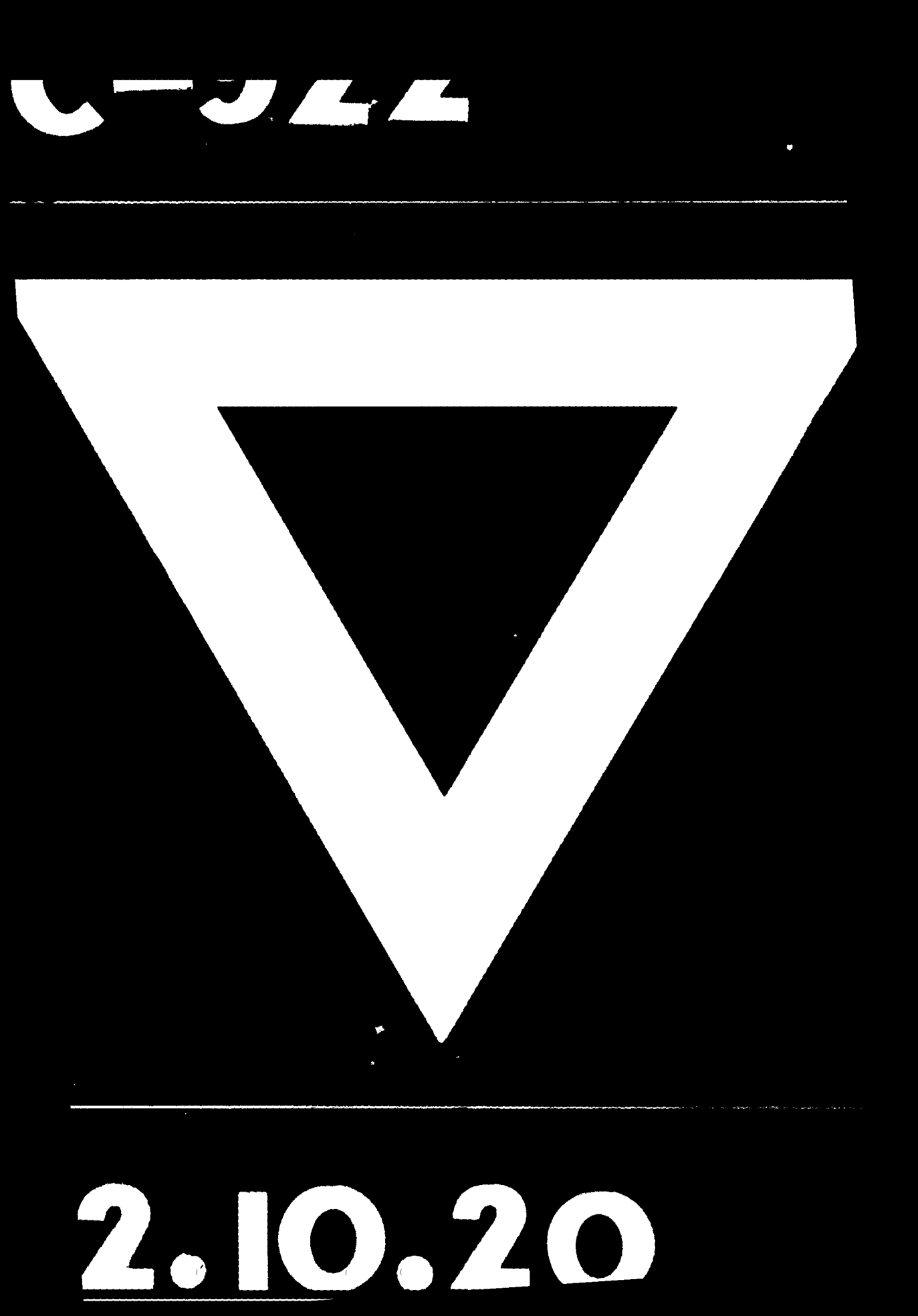
17				

DC 1124 PL 11-74

SK: Sorteringskriterium



C-522

2.10.20