

SHIP UPKEEP INFORMATION SYSTEM

BY

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UPKEEP—Definition in DCI 926/70—All resources required to assure or restore a specified material condition or level of performance.

History

In 1967 a feasibility study was commenced on the requirement for upkeep information. The results of this study were published in a Ship Upkeep Information System (SUIS) report in 1968. The system proposed, together with the programme for implementing, designing and installing it, was approved, *vide* DCI 1144/69.

SUIS is being developed by a four-man team, which includes two Commanders of the Engineering Specialization, known as the Ship Upkeep Information System Team (SUIST). This is headed by Mr. A. F. Weeks, a Chief Constructor of the Royal Corps of Naval Constructors.

The development of the detailed Automatic Data Processing (ADP) system, its installation, proving, operation and maintenance is the responsibility of the Ship Upkeep Information Centre (SUIC) project team working in the Portsmouth area. It is organized in three groups under the writer who is the Head of

SUIC and also a member of SUIST. Each group is headed by a Senior Executive Officer with responsibility for specifying the input to the system and meeting the information requirement of users of the system as follows:

Group 1. Dockyards and Bases.

Group 2. Ships, SMA and Administrative authorities.

Group 3. Headquarters and Naval Staff.

The system is being introduced progressively over the next four years with the initial accent on *Leander* Class frigates. The ships' contribution to the system is vital to success, and trials are now under way with a revised Night Rounds Report (S.2076) and Upkeep Event Card (to replace the S.2018 Job Card) in selected ships. The data reported on the revised forms will be processed by a hired computer to calculate upkeep cost and equipment reliability.

Meeting Report

A meeting was held between the MEO and WEO of H.M.S. *Arethusa* and the staff of the Ship Upkeep Information Centre to give the SUI ADP project team at SUIC an idea of the sort of questions which ships staff would like answered. The salient points of this meeting are given below, in question-and-answer form, to amplify what has been officially promulgated about SUI.

Q Arethusa. Have the aims of SUI altered since DCI(RN) 1144/69?

A. SUI. The aims have not altered. The DCI explains that SUI will measure the cost of upkeep, and compare this with the resulting effectiveness of equipment. The aims have been clarified, and are now presented in more detail in Volumes 1 and 2 of the System Definition, which have been distributed to various authorities including the ships currently involved in SUI trials.

Q. The main function of SUI would appear to be the collection and analysis of the material availability data which is at present sent to SMA. Would it not be more logical to develop the appropriate section of SMA, equipping them with ADP if necessary?

A. As the DCI explains, the analysis of information on equipment and ship availability diverts the SMA from its main task which is to sort out the planned maintenance requirements of the Fleet and carry out technical investigations into maintenance problems. The object of introducing SUI is to tailor the information flow to whoever has a requirement. The SMA will have an interest in only part of the total information flow. Other information will go direct to Design Departments and Naval Staff.

Q. In order to update the maintenance schedules and make recommendations about the periodicity of maintenance, the SMA will obviously need information on which to base the updating of their maintenance system.

A. One of the aims of SUI is to establish a principle of reporting one fact once only to SUIC. It will be our job to make sure that these facts are presented in the most suitable form to all the authorities interested in them, including SMA. We are planning to use the power of the computer to do the sorting, analysis and supply of information.

Q. The present system of reporting leaves a lot to the MEO's discretion. The amount of feed-back from job cards, S2022 and maintenance man-hours is poor and adversely affects the reporting from MEOs. Replies to S2022s are slow and sometimes the replies are critical. This criticism deters MEOs from reporting. How is SUI going to get better information from the ships and improve the feed-back of information to the ships?

A. This is a two-fold problem. Firstly job cards received by SMA do not represent the total amount of maintenance work done. On the other hand the job cards that are received are too numerous to be processed by manual means, and the computer facilities available to the SMA are now reaching their limit. The aim is to rationalize and streamline internal procedures on ships to help the ships' officer run their departments, and at the same time, with a minimum of additional effort, provide information to be passed ashore. Better computer facilities will be provided ashore to speed up the processing and feed-back. Since SUIIS will be entirely dependent upon the data provided from ships it is obviously vital that this as accurate and complete as possible. Ships must regard themselves as part of the whole organization.

Q. But the computer will not be able to tell us *why* a machine has failed. What is going to take the place of the present S2022 system, where we have a particular problem we want answered, in order to help the ship? In other words your data processing is fine for the operational staff for knowing the material state of the ship, but there seems to be a big gap in assisting the ship in answering the questions which are worrying them, when they are on their own deployed to the Far East or West Indies.

A. The S2022 in its present form represents the results of investigation carried out by the ship. The ships staff may not know whether the defect is particular to their ship or whether they are experiencing the same problem that every other ship in the Fleet is having; so the MEO is having to make judgement on only the small sample with which he is in contact. The principle behind SUIIS is that reports of these events will come ashore, be processed and compared with pre-determined norms of what the designers thought ought to happen. Exception reporting will thus avoid flooding Design Departments with paper far beyond the capacity of the recipients to read. The attention of the appropriate authority can thus be directed to the unusual, and a Design Department can then either ask the SMA to investigate in depth, perhaps involving visits to the ships, or ask the ship for further information. We still see the need for special reporting, and ships staffs with their technical experience will naturally be able to identify problems which are causing them embarrassment. In this way one ship in trouble will send a report ashore and the bank of information built up by SUIIS will enable the difficulties of this one ship to be compared with what is happening throughout the Fleet. At the moment each particular incident tends to be treated in isolation. Whether a ship has reported an isolated incident or otherwise will be fed back to the ship as appropriate.

Q. The speed of processing information is important, obviously not only with the object of producing rapid solutions, but also to achieve the stated aim of reducing unnecessary reporting. What can we expect SUIIS to do in this respect?

A. The present system of reporting demands or allows the same information to be reported by ships to different authorities on different forms. With SUIIS becoming the focal point for all reports on upkeep from sea and only asking for each fact to be reported once, SUIIS does expect to end all unnecessary reporting. However it would be quite wrong to expect SUIIS to present an instant cure for all technical problems. What we are planning to do is to direct attention to the worst problem areas in terms of manpower being expended in upkeep, poor reliability or low availability. But there again one has to be careful to get the right sort of parameters to identify the rogues. For example, perhaps an equipment is taking a tremendous number of man-hours of maintenance, and thereby achieving better reliability than is necessary as a whole to perform its role. The answer then could be a decision to reduce the maintenance load and accept a lower reliability. Another of the motivations behind SUIIS was a feeling that

perhaps more effort should be given to post-design to improve the equipments in service. It would be mistaken to think that marked improvement is going to appear for anything shorter than two or three years. We have got to be collecting for some time in order to have a base of information that is either sufficiently meaningful, or sufficiently reliable, or sufficiently representative, to enable the pin-pointing to be done in the way intended.

Q. Defect reports, which are obviously going to play a large part in the system, have been with us for some time yet are not rendered in the ideal format. A form with a large number of 'yes/no' and 'tick the box' type of questions would be easier and quicker to complete.

A. Trials onboard ships will be used to establish the most suitable form in order to minimize the effort needed to render the required reports.

Q. You have mentioned statistical methods with data analysis but can these be used when only comparatively small numbers of equipments are involved?

A. The population of some of our equipments is small but this does not invalidate statistical methods. It does influence them insofar as a lower confidence factor may have to be given to a statistical analysis based on a low population.

Q. How will SUIIS calculate downtime in view of the need to differentiate between the time an equipment is not operational as a result of a failure and the time taken to repair?

A. The extent to which it will be necessary to differentiate between different parts of down-time in order to calculate reliability is being studied by the Reliability Group in the Directorate of Fleet Maintenance. When this has been decided it is intended to include the definition of down-time, along with other SUIIS terminology, in Volume 5 of the SUIIS System Definition.

Q. You have mentioned predetermined 'norms' but will SUIIS be able to take into account the fact the material usage is subject to large variations due to external facts such as ships employment?

A. SUIIS will collect and process ship activity with the object of relating any significant factors such as operation in arctic waters, etc., to equipment performance. Different 'norms' can also reflect environmental conditions.

Q. Do you intend to use elapsed time meters to account for material usage?

A. Yes, where the importance or function of the equipment justifies the cost of procurement and fitting. Other methods may also be required but these will be devised to minimize the recording and reporting load onboard.

Q. One of the main peak periods for paper work is pre-refit when defect lists, trials lists, etc., have to be submitted. Do you have any intention of tackling this particular problem?

A. This could prove to be one of the most fruitful areas where ships staff effort could be reduced. It is anticipated that SUIIS will be able to print out the outstanding work in a ship so that only the most recent defects would have to be listed by ships staff. In addition, ships and other interested customers will receive up to date statements of As and As and modification states of equipment.

Q. It does seem that *Leanders* generally suffer from having various trials imposed on them resulting in a lot of additional paper work. SUIIS in the trial stage will almost certainly add to the present state of affairs. Who is controlling all these trials and is anyone aware of the additional paper work which is being added?

A. We are very keen that SUIIS should not become just one of many trials and proposals have been made to bring the various management trials being carried out in *Leanders* under a common control.

Q. There appears to be a danger of a comparative table being produced of ships material availability following the compilation of information from the Fleet. Such a league table may deter some COs from reporting defects.

A. It is not for SUIIS to decide what information is to be given to each recipient. One of the objects of SUIIS is to provide information to enable numerate comparisons to be made.

Q. Who will man SUIC and what are expected to be the savings from SUIIS?

A. SUIC is presently manned by a mixture of civilian and naval personnel in order to provide the required ADP and technical experience necessary to design the system. We hope to save of the order of £6m per year, and obviously one must show that SUIIS itself is cost-effective. Both the Army and Air Force are operating comparable systems and we have examined their experiences in this field. In addition we have examined both the American and French naval systems.

Q. There does appear to be an implication behind what has been said that SUIIS will result in more control of ships from ashore and less freedom of action by the Fleet.

A. This is not the intention. SUIIS is not in the decision-making business or the design business but is aimed at being a management information system. It is believed that sufficiently accurate data can be collected for our needs. Your fears can best be allayed by emphasizing that it will be more effective control from ashore rather than just more control. How effective SUIIS will be can best be answered by looking at the attributes required of a management Information System:

- (a) It should measure the impact of decisions—either before or after they are made.
- (b) It must measure the environment, because this cannot be controlled nor can forecasts of the effect of changing external circumstances be made.
- (c) It should react in an appropriate time frame—to enable development of potential trouble areas to be highlighted in time to take meaningful action.

Conclusion

To conclude, it should be clearly understood that the success of SUIIS depends just as much upon the upkeep data being supplied by ships as it does upon timely action being taken on the information produced by the computer.
