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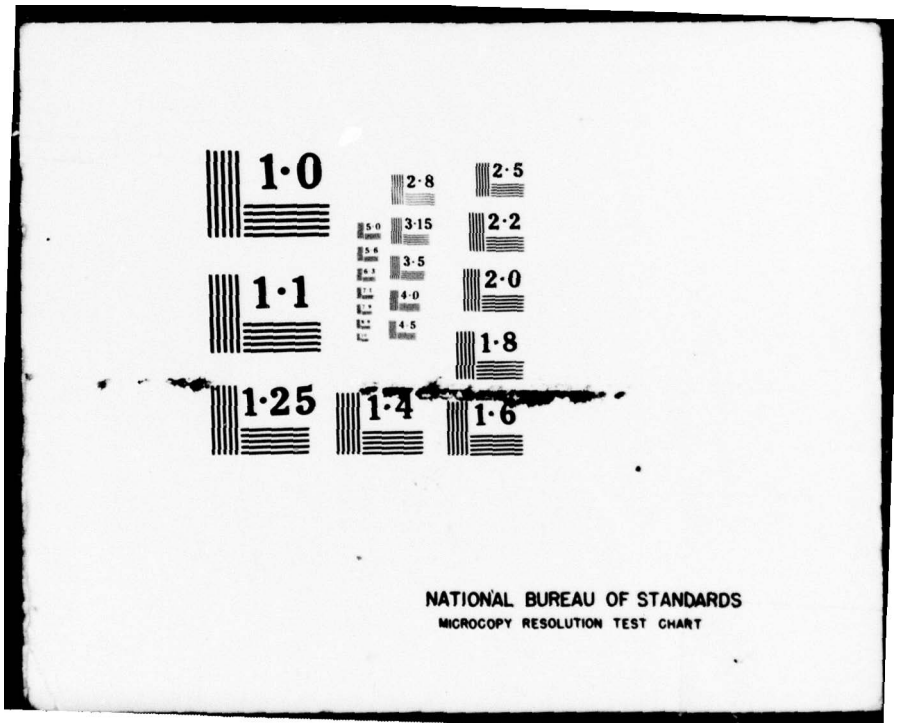
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THE DYSPORT INFORMATION SYSTEM

by

W. Onak

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The DYSPORT Information System

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In August 1976 the DYSPORT information system was put into operation by the Association of Seaports. It includes the Port Administrations of Gdynia, Gdańsk, and Szczecin as well as the headquarters of the Association of Seaports, and one of its terminals is installed in the Ministry of Foreign Trade and Maritime Economy in Warszaw. Among the information systems introduced thus far in the Association of Seaports, this is the first on-line system.

Origin of the System

One of the tasks of the Association's headquarters is to coordinate utilization of the transshipment capacity of commercial seaports with accomplishment of the transshipment plan and performance of transport and cargo services. Operational tasks in this area are performed primarily by the Dispatching Section.

The basic condition for effective operation of the Dispatching Section is the day-to-day collecting and updating of information about ongoing port activity. Analysis of this information makes it

possible to reach decisions involving coordination of operations and to recognize a need to intervene in port administrations and with contracting parties to seaport trade. It also provides a basis for possible decisions to intervene at higher levels of administration.

Until now, collection of this information was carried out by workers from the Section. Each day (except Sundays and holidays) between 7 and 830 AM, at a certain time for each port adminstration, reports transmitted by dispatchers or other offices of the port administrations were received by telephone. The information was dictated in a certain format and recorded by hand in the Section in appropriate books, tables, forms, etc. After a complete collection of data was obtained from the ports, the necessary processing began, i.e. adding up data, calculating transshipment plan indices, etc. Then a written situation report was prepared for transmission to superiors. All this work occupied some three hours.

The collection and processing of information were the Section's most tedious and labor-intensive tasks, and at the same time the most suited to computerization. Therefore the Seaport Research and Development Center undertook work to modernize this activity and initiate preparation of an information system.

The long-range plans for development of computer science in ports envision the creation of a decision-making subsystem for "production planning and control," which includes the headquarters of the Association of Seaports. The DYSPORT system was conceived as a component of this complex information system, which will interface with it in the future.

The technical foundations and name of the DYSPORT system were developed at the Seaport Research and Development Center. The Computer Science Center in Gdynia was responsible for technical design, software, and implementation of the system.

Purpose, Subject Matter, and Scope of the System

The purpose of the DYSPORT system is to create conditions for the rapid extraction of basic and processed groups of information on the progress and results of transshipment activities for operational coordination of transport and loading facilities. The purpose of the system is also to permit on-line utilization of information for performing essential and immediate analyses. Also of importance is the fact that it facilitates the work of the Dispatching Section.

The system includes groups of information on

- size of transhipments of particular groups of cargo,
- movement and servicing of vessels in ports,
- the employment situation of trans-shipment personnel
- provision of freight cars by the Polish State Railways,
- turnover of gondolas and servicing by the Polish State Railways,
- quantity of cargoes stored at yards and in warehouses.

This information applies to the Port Administrations of: Gdańsk, including the port of Północny; Gdynia; Szczecin, including Świnoujście.

The time range of the system embraces daily acquisition and processing of data representing events of the past 24 hours as well as on the situation in the morning of the current day. Detailed

data from each past 24-hour period of the current year and the preceding year are in computer storage, and it is possible to store comprehensive data from each quarter and year of a five-year period.

Functioning of the System

Transmission of information to system input. Every morning, except on Sundays, holidays, and free Saturdays, by 730, the Port Administrations transmit to the Computer Science Center in Gdynia information on events related to the above-mentioned files. Information for days without transmission is sent on the next working day, but this includes only a small portion of data necessary to register incremental quantities (transshipment size, orders filled for railroad cars), leaving aside information useful only on the day of its transmission.

A Port Administration transmits about 100-140 basic items of numerical data, whose number depends on the number of events which have occurred. For example, if there are no orders for Polish State Railway cars, the quantity of data transmitted may be reduced by about 30-40 items.

All numerical data are formulated in the order established for the system and transmitted in the form of digital code suitable for the system.

Irrespective of the numerical information, a Port Administration can transmit a brief uncoded statement when it is necessary to report a particular event which is not included in the formulated transmission. Coded information is shown as follows:

```
054421 cirz pl
054221 zpga pl
godz. 7,25
nadajemy system dysport
(6)
(1, 260376,

1,2690,2605,1361,10301,8489,19312,44758,,
2,2157,1950,207,,145,,,,451,2420,
3,281,64,260,461,44,1110,
4,203,,,,,203,
5,91,3,,,,94,
6,70,,,,,70,
7,64,19,225,263,22,593,
8,121,,,,,121,
9,44,3,,,,47,
10,70,,,,,70,
11,90,70,,,,,
13,150,3500,2434,43000,
14,17499,,17499,,
17,26934,,26934,,
19,112762,22942,61386,74318,
20,2387,2060,
21,1407,189,
22,28600,5000,)
(2,270376,
1,1,2,1,4,,27,,35,
2,1000,20600,5000,62800,,78900,,168300,
3,1,2,1,3,,19,,26,,
4,1000,20600,5000,33100,,46800,,106500,
5,,,,,,1,,1,
6,,,,,,400,,400,
7,,,,1,,8,,9,
8,,,,29700,,32100,61800,
9,,,,1,,7,,8,
10,,,,29700,,30100,,59800,
19,,,,,,1,,1,
20,,,,,,2000,,2000,)
(6,
1, w dobie ubieglej odnotowano 10 godzin opadow deszczu,) =
nadala: jadwiga kowalska
054221 zpga pl
054421 cirz pl
```

The coded information reads:

We are transmitting DYSPORT system

Gdynia Port Administration

Document 1, 26.3.1976

1. Transshipment during the past 24 hours in tons:

coal	-	2690	wood	-	--
ore	-	2605	general cargo	-	8489
other bulk	-	1361	liquid fuels	-	19312
grain	-	10301	total	-	44758

2. Employment situation for transshipment workers

workers needed	-	2157	shortage	-	207
workers supplied	-	1950	surplus	-	--
Shortage made up:					
by WRP	-	145			
other	-	--			

Utilization of surplus:
from WRP --
other --
Administrative activities - 451
Number registered - 2420

3. Orders filled for RR cars
etc.

Document 2, 27.3.1976
Vessels

Category of cargo	Number of vessels	Tons
coal	1	1000
ore	2	20600
other bulk	1	5000
grain	4	62800
wood	-	--
general cargo	27	79900
liquid fuels	-	--
total	35	168300

etc.
Document 6, Uncoded remarks
1. In the past 24 hours 10 hours of rain were noted.
Sender: Jadwiga Kowalska

The prepared record is transferred to punched tape and sent by teletype the Computer Science Center.

Processing of information. In the Computer Science Center the next operating phase of the system begins. The received records are checked for correct writing and entered in the main collection in the computer, where they undergo processing, which primarily includes:

- putting together information from the individual ports within the Association of Seaports;
- adding of incremental quantities calculated from the beginning of the month, quarter, and year;
- computing performance indices for monthly, quarterly, and yearly plans, and computing indices for other compared quantities;

- examining quantities of daily transshipments and comparing them with corresponding information in the collection;
- grouping information into appropriate sets with a particular format.

The time required for operators to input data into the main collection is about one half-hour, which means that around eight o'clock the users of the system can use it for their needs.

Obtaining system output. As of now the system users are the headquarters of the Association of Seaports and the Ministry of Foreign Trade and Maritime Economy, which have terminals with monitors and necessary equipment. The Association headquarters also has a printer connected to the monitor, allowing printouts of material shown on the monitor.

To increase accessibility, installation of monitors in the facilities of the chief dispatchers of port administrations is also planned; the dispatchers will be able to input information records directly into computer storage at the Center. At the same time, they will be able to use processed records, just as the Dispatching Section presently does. For the time being, however, economic considerations compel them to use teleprinters to send information to the center.

The quantity of basic and processed data from each day which is stored in the computer is too great to be presented at one time on a monitor screen. For this reason data are grouped by a program into appropriate sets, which can be called up on the screen in any order. There are 40 such sets. It is possible to select any sets from not only the most recent day, but other stipulated days as

well. Since the information yielded in the DYSPORT system is partly confidential, work on a monitor may be begun after entering a key word, which can be changed. A key word consists of a combination of numbers.

Sets of information. Sets 1, 2, 3, and 4 contain information on the trans-shipment plans for a given month, quarter, and year, as well as on indices of their fulfillment for a stipulated day. The information applies to each port with respect to specific types of cargo and to the combined total for each port and also for the Association of Seaports.

Set 5 shows the employment situation for trans-shipment workers in individual ports and in the Association as a whole, including total personnel and labor supply and demand, on a given day or as the average for a month.

Sets 6 through 10 contain data on the number of vessels in each port (as of 7:00) and on the size of their cargo with distribution according to types of commodities and trans-shipment activity or inactivity (with reasons for the latter condition).

Sets 11-16 pertain to the filling of requests for railroad cars in individual ports, indicating the number of cars requested and delivered according to car types and forwarding agents concerned. Table 1 is an example of set 13.

Set 17 contains specific information on the turnover of gondola cars in each port (the number of cars with coal at 00:00, cars arrived with coal, empty cars turned in, cars remaining with coal at 24:00, cars requested, cars brought up).

Sets 18-21 show the status of cargoes in ports by types of

cargoes. They include the movement of coal in port and the tonnage of cargoes in warehouses and yards with distribution into exported, imported, and transit commodities. Table 2 is an example of set [number omitted]

Sets 22-27 give a synthetic presentation - by ports and by the Association of Seaports as a whole - of records already essentially contained in preceding sets. They also have information on the size of trans-shipments of the separate types of commodities from the preceding 24-hour period, since the beginning of the month, the quarter, and the year, and their respective plan fulfillment indices.

Set 28 is reserved for uncoded remarks from the ports. They can be called up for each port separately. An absence of text on the screen produces the message "No remarks from port."

Sets 29-34 contain detailed data concerning the status of trans-shipments in each port separately, in a format similar to that in sets 22-27. For example, information on the Gdańsk Port Administration deals separately with the port of Gdańsk itself and with Port Północny, while in preceding sets this information embraced the entire Gdańsk Port Administration, including Port Północny.

Sets 35-39 are for data on peak trans-shipments. Table 3 gives an example. The following information can be extracted:

- the probable record trans-shipment achieved for a 24-hour period in any of the cargo categories for any of the ports;
- the size and date of this record;
- the size and date of the former record;

- the size of peak monthly trans-shipments and their month and year, broken down by commodity groups and ports;
- the size, month, and year of former peak monthly trans-shipments
- the record trans-shipments of an entire port and the Association for 24 hours and a month.

The remaining set 40 serves for monitoring the system by revealing which of the ports has or has not transmitted the information on the day in question (up to a given time).

Conditions for efficient operation of the system. The primary condition for efficient operation of the DYSPORT system is the proper transmission of basic data by the port administrations. Correct recording on the punched tape is very important here; the recording must meet precise technical requirements. Even the use of the wrong punctuation mark in a given place causes serious complications in storing a record in main memory or at least substantial distortion. Thus, for instance, a monitor might show a figure of 700% for fulfillment of a port's monthly trans-shipment plan, or a single delivery of 5000 gondolas by the Polish State Railways in Swinoujscie. If errors of this kind occur in incremental quantities, false information is repeated on all succeeding days.

Punctual transmission of data to the Center is also very important. Delay in transmitting leads to delay in obtaining processed information on a monitor. Incomplete data makes calculation of totals and indices impossible, complicating the work of the Center, which has allotted CPU operating time for the DYSPORT system. At the same time, and even more importantly, it delays the activity of the Dispatching Section.

Another especially decisive factor in system efficency is the reliable performance of the Center's equipment and operators. Here too observance of time and accuracy requirements is necessary. For while an interruption of even several hours may not play a critical role in the execution of computations ordered by some enterprise, with the DYSPORT system an interruption during the morning hours can disrupt the activity of the system for that day.

There are still more conditions for efficient operation of the DYSPORT system, but those given above are decisive and therefore most important.

The conditions mentioned for efficient functioning of the system are based on its special feature, real-time operation. Thus, the purpose which the system is to serve can hardly be accomplished without timeliness, reliable equipment, and accurate and conscientious work by all persons operating the system.

First Observations and Conclusions

Before being put into operation, the DYSPORT system went through a sufficiently long break-in period, three months. Difficulties arose at the time from the fact that the system was a complete novelty in the ports, as well as at the Center.

In the port administrations it directly involved workers from port operations departments, among whom there was no one with the necessary computer training. So there was a need to learn the techniques of preparing and transmitting data records and to become used to tight organization. Until this came about, there were problems with the correctness and timeliness of transmission.

The Center too had certain initial difficulties in adjusting

to serve the DYSPORT system.

At present the system basically works efficiently. From time to time, however, errors appear in records transmitted by the ports and are promptly corrected. There are also breakdowns in communications or at the Center which can complicate use of the system. Thus it has become necessary to establish an appropriate procedure in all such cases which will ensure continuity of the flow of information, especially to the Dispatching Section.

The first operating period of the DYSPORT system revealed the need for its refinement. The creators of the system had no examples on which to base their work. A result of the rather long period of planning and breaking-in was that the requirements for the system changed somewhat.

In connection with a broadening of the Dispatching Section's sphere of activity, it has become necessary to obtain a certain amount of basic information about each vessel in port on a given day (cargo category, name of vessel, amounts of cargo on board on a given day which are being exported and imported). This information has become indispensable for efficient use of the shipping capacities of the ports. At the same time, practical use of DYSPORT has shown that among the large number of tabulated forms some are not used. There is also a need for small program modifications to increase the clarity of groups of information used in system output. One of the necessities is to add to the program several monitoring operations which prevent emission of contradictory or incompatible information when it is transmitted from a port.

For all these reasons we already intend to carry out certain

system improvements in the near future to adapt it to the changing needs. While creating the system, of course, we planned for its flexibility, which would allow it to be adjusted to changing conditions and requirements.

The DYSPORT system is already making operations more efficient, particularly those of the operations and dispatching organization at the Headquarters of the Association of Polish Seaports. The Dispatching Section no longer performs tedious daily writing and counting of data received by telephone, nor does it spend time on the editing and typing of daily situation reports, which are now obtained as print-out of the information sets called up on the monitor screen. These reports are not sent by mail to Warszaw, because persons concerned can receive them immediately on a monitor. It is possible to examine already compiled information about past periods without copying and calculating it each time according to the system needed for analysis: it can simply be reprinted.

These uses are one-sided, since the port administrations are deprived of them for the present. DYSPORT does not yet operate on a feedback basis. Initial operation of the system has confirmed that it would function with considerably more efficiency if information could be transmitted in both directions. This would substantially increase both the effectiveness and the use of the DYSPORT system, as is evident from the interest shown in its work by the personnel operating all terminals.

Fig. 1. DYSPORT system structure

1 Ministry of Foreign Trade and Maritime Economy

2 Headquarters; Director-in-Chief

3 Association of Seaports - Gdynia; Dispatching Section

4 monitor

5 printer

6 Computer Science Center; Foreign Trade and Maritime Economy; Gdynia

7 central unit

8 Port Północny

9 Chief dispatcher

10 Gdańsk Port Administration

11 Gdynia Port Administration

12 Szczecin Port Administration

13 Szczecin

14 Świnoujście

15 teletype

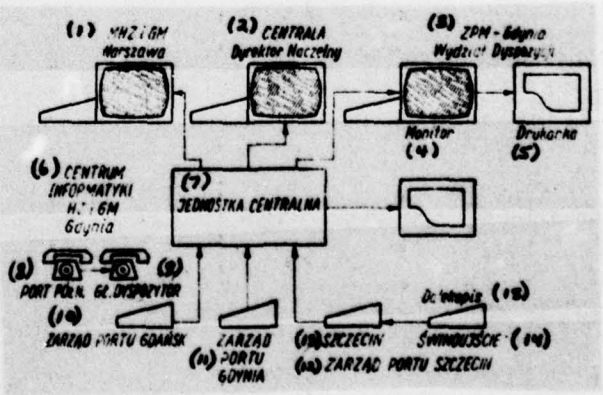

Table 1. Turnover of gondola cars on 26.3.76

	Gdańsk	(10) Port Pn	Gdynia	Szczecin	Świnoujście/ Kołobrzeg	(1) ZPS
(2) Stan wagonów z węglem godz. 00.00	66	90	488	94		738
(3) Przybyło wagonów z węglem	137	390	70	298	283	1178
(4) Zdano wagonów pustych	95	424	160	558	350	1479
(5) Zostało wagonów z węglem godz. 24.00	48	32		224	127	425
(6) Zamówiono wagonów	420		203	491	78	1114
(7) Podstawiono wagonów	201		121	204	72	526
(8) Stosunek wagonów podstawionych do zdanych %	212		76	37	29	36
(9) Stosunek wagonów podstawionych do zamówionych %	48		60	42	92	47

1 Association of Seaports

2 number of cars with coal at 00:00

3 cars arrived with coal

4 empty cars turned in

5 cars remaining with coal at 24:00

6 cars ordered

7 cars brought up

8 ratio of cars brought up to cars turned in (%)

9 ratio of cars brought up to cars ordered (%)

10 Port Północny

Table 2. Situation report for 26.3.76

1 Port Północny

2 Association of Seaports

3 tons trans-shipped in 24 hours

4 coal

5 ore

6 other bulk commodities

7 grain

8 wood

9 general cargo

10 liquid fuels

11 total

12 tons trans-shipped since beginning of month

13 highest total daily trans-shipment in current year

	Gdańsk	Port Północny (1)	Gdynia	Szczecin	Świnoujście/ Kołobrzeg	razem (2)
			(3) Przeładunek za dobę ton			
(4) Węgiel	33 114	30 161	2 699	38 416	6 787	74 220
(5) Rudy			2 609	10 366	343	12 971
(6) Inne masowe	8 002		1 361	8 149	2 067	17 512
(7) Zboże	4 506		10 301	5 284	1 400	20 091
(8) Drewno	871			550		1 321
(9) Drobnica	6 770		8 439	4 931		20 190
(10) Paliwo płynne	115 364	115 364	19 312			134 676
(11) Razem	168 687	145 525	44 758	67 696	10 597	281 601
			(12) Przeładowano od początku miesiąca ton			
(7) Węgiel	329 458	457 889	217 599	798 014	285 760	1 599 465
(5) Rudy	80 935		66 881	201 792	48 871	348 768
(6) Inne masowe	255 868		45 779	196 379	11 855	498 086
(7) Zboże	98 479		235 358	141 993	28 820	475 830
(8) Drewno	37 558			36 499		74 057
(9) Drobnica	194 352		316 167	216 747	21 094	727 866
(10) Paliwo płynne	222 340	222 340	147 529	5 300		375 169
(11) Razem	1 468 987	680 229	1 028 853	1 596 731	395 800	4 094 571
			(13) Najwyższy przeładunek dobowy ogółem w bieżącym roku			
(11) Razem	168 687	145 525	63 461	83 813	32 810	281 601

Table 3. Peak trans-shipments in a 24-hour period (tons)

1 Port Północny

2 Association of seaports

3 coal

4 date

5 ore

6 other bulk commodities

7 grain

8 wood

9 liquid fuels

10 total

	Gdańsk	Port Pn (1)	Gdynia	Szczecin	Świnoujście/Kołobrzeg	BPH (2)
(3) Węgiel	56 586	43 700	38 104	57 507	27 269	107 488
(4) Data	05/02/75	28/12/75	05/02/74	16/04/75	18/02/76	17/02/76
(5) Ruda	14 297		18 310	22 400	11 066	31 897
Data	07/06/66		25/04/75	15/07/74	10/01/76	18/12/75
(6) Inne masowe	25 772		11 425	23 458	4 770	30 838
Data	04/06/74		23/07/66	21/05/73	24/01/76	11/03/76
(7) Zboże	7 027		15 374	14 065	4 200	27 414
Data	24/01/76		24/03/76	17/01/76	04/02/76	17/01/76
(8) Drewno	8 128			4 762		10 877
Data	12/03/76			13/02/76		12/03/76
(9) Drobnica	13 194		21 720	20 858	11 000	45 668
Data	13/02/67		12/03/76	23/02/76	01/03/76	23/02/76
(10) Paliwa płynne	115 364	115 364	30 433	5 300		134 476
Data	26/03/76	26/03/76	15/08/75	24/03/76		26/03/76
(10) Razem	168 627	145 525	77 075	90 318	33 395	281 081
Data	26/03/76	26/03/76	11/12/75	11/12/75	17/02/76	26/03/76

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