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THE ANALYSIS OF THE PRESENT STATE OF POSSESSION AND UTILISATION OF MEANS OF COMMUNICATION IN UNITS OF STATE FORESTS AND FOREST EXPERIMENTAL STATIONS

Zenon Pilarek, Monika Gdaniec
Agricultural University of Poznań

Abstract. During investigations carried out by the questionnaire method, information was collected about means of communication used in units of State Forests, the usefulness assessment of the individual types of equipment for work and the evaluation of the degree of utilisation of the investigated pieces of equipment. In situations, which are not hazardous to the existence of the forest, it is the cell phone that is thought to be the most important (94.4% of those questioned described the usefulness of mobile phones as essential or necessary). The network of radiotelephone communication is essential in situations of threats posed by forest fires or other natural disasters. The remaining tasks carried out with the assistance of radiotelephones are of secondary importance. Data transfer is conducted most frequently using traditional cable phones. A relatively small number of respondents takes advantage of additional facilities and functions offered by various network operators (e.g. 5% uses fax machines and 20% – the automatic secretary).

Key words: means of communication, desktop telephone, cellular telephone, radiotelephone communication

INTRODUCTION

The high rate of development of many sectors of economy and the need to speed up the information exchange, as well as the ever-increasing number of participants make it compulsory for companies to have a well-functioning system of communication without which their operation would come to a stop. State Forests belong to these units in which the system of reliable communication is one of the most important elements of their operation.

The work outdoors makes means of communication indispensable in order to send out and obtain essential information or instructions. A good system of communication allows, among others, to:

Corresponding author – Adres do korespondencji: dr inż. Zenon Pilarek, Department of Forest Work Mechanization of Agricultural University of Poznań, Wojska Polskiego 71c, 60-625 Poznań, e-mail: zpilarek@ au.poznan.pl

– perform prophylactic activities, in particular, detect and locate forest fires and to undertake appropriate rescue operations,

– remove various threats and liquidate damages of other types of disasters occurring in forests,

– save health and life of victims of accidents,

– organise work of employees of State Forests or companies providing forest services [Pilarek and Podwójska 1996, Santorski 1998].

Modern communication involves not only traditional possibilities of communication by means of human voice using, for this purpose, various kinds of equipment. In the age of the Internet, possibilities of sending and getting all kinds of data are equally important. In the case of the State Forests, one of the important elements of communication between different levels of management is the transmission of the information gathered in the forest (to the registrar) from the forest range to the forest inspectorate and, possibly, to units at higher levels. This results in a significant reduction of the transmission time.

The importance of the efficient system of communication is well illustrated in the situation of forest fires. According to the data from the Central Statistical Office [Leśnictwo 1995], in the case of particularly unfavourable atmospheric conditions, the number of forest fires may exceed 4500 a month. Forest fires, which occur on wide expanses of limited range of visibility and audibility, require a precise and accurate communication structure. The alarm and dispatch system must be independent and must guarantee that the alarm will reach the appropriate unit and the confirmation of the reception of the message will be sent back [Wiśniewski 2001]. In the State Forests, apart from the cable telephone communication, the basic alarm communication also comprises the radiotelephone network.

An exceptionally rapid development has also been observed in recent years of the mobile, or cellular phone networks. The number of subscribers increased from 75 thousand in 1995 to 6 748 000 in the year 2000 and to 13 898 000 in 2002 [Mały rocznik... 2003].

Providers of mobile phone services often fight ruthlessly for customers on the Polish market offering a wide-ranging choice of tariffs and hand-held handsets. A considerable improvement of the coverage of individual networks all over the country resulted in a steady increase of the utilisation of mobile phones, also by organisational units of the State Forests. The advantage of the cell phone over the radiotelephone communication is that mobile phones allow communication not only with units of the State Forests and rescue services but also with workers employed in forest service enterprises, timber carriers as well as buyers. In addition, mobile phones are exceptionally versatile (are equipped in a clock, a calculator, reminder function etc.). However, increasingly popular cell phones should not be employed as alarm communication because, in forest conditions, they do not always remain in contact with their transmission stations (the so--called, 'dead areas') [Santorski 2001]. Furthermore, there are also problems in transferring information to several receivers at the same time and, additionally, the required cell phone may be busy and the time of getting through with a call (several seconds) is relatively long and this, in times of crisis, may be of crucial importance.

The objective of this research project was to determine the actual number and types of means of wire and wireless communication in the possession of organisational units of the State Forests, evaluation of its effective range and usefulness of individual types of this equipment at work and assessment of utilisation of the above-mentioned facilities.

MATERIAL AND METHODS

The investigations were carried out using the questionnaire method, which covered 200 units all over the country. The total of 198 questionnaires were sent to forest inspectorates of the State Forests, whereas 2 were sent to structures operating in Forest Experimental Stations of the Agricultural University of Poznań.

Questionnaires were sent to 5 selected forest ranges of each forest inspectorate and the whole operation lasted from August to the end of October 2003.

The information obtained from questionnaires was first pooled, grouped into appropriate tables and then subjected to analysis.

The collected information referred to:

– the number of the equipment in possession of organisational units divided into:
  a/ desktop telephones,
  b/ mobile phones (office and private),
  c/ radiotelephones,

– network operators, utilised additional functions available in desktop phones or offered by a given operator such as:
  a/ tone selection,
  b/ automatic secretary,
  c/ fax,
  d/ voice mail,
  e/ utilisation of the telephone line enabling the subscriber to get the Internet connection or exchange data with another computer (by means of a modem),

– the number of mobile phones and radiotelephones in possession of the given unit according to the make of the facility,

– the effective coverage of mobile phones and radiotelephones[5],

– the usefulness of means of wireless communication for work, which was described in a four-point scale:
  a/ essential,
  b/ necessary,
  c/ useful from time to time,
  d/ unnecessary,

– the number of radiotelephones of a given type in the possession:
  a/ desktop type,
  b/ transportable,
  c/ portable,

– the frequency of utilisation of radiotelephones in a five-point scale:
  a/ frequently,
  b/ from time to time,
  c/ seldom,
  d/ sporadically,
  c/ not at all,

[5] The coverage was considered effective when the conversation was audible and understood without frequent interruptions of the connection. Questions referring to the range of coverage, the following 5 intervals were applied: 0-25%, 26-50%, 51-75%, 76-95% and > 95% of the surface of the concerned unit. The last interval was treated as the coverage of the entire unit area.

– the frequency of utilisation of radiotelephones for specific purposes:
  a/ performing tasks in forest economy,
  b/ fire protection,
  c/ other (e.g. hunting economy, forest damages etc.).

RESULTS

Responses to the despatched questionnaires were submitted by 883 forest ranges from 136 forest inspectorates and from 2 Forest Experimental Stations. Three forest inspectorates submitted their responses in the form of a cumulative questionnaire (covering the entire inspectorate). The responses were sent in from the total of 141 forest inspectorates, which constituted 70.5% of the sent off questionnaires.

From among 139 forest inspectorates constituting organisational units of the State Forests, 65 were allocated to the 2nd category of forest fire hazard, slightly fewer, i.e. 56 – to the 1st category and only 18 units were classified as areas of low fire hazard (3rd category).

Desktop telephones

In the case of the State Forest units, this type of communication can be considered as the basic one. Out of the total of 670 units, 657 (98%) stated that they had desktop telephones, of which 99% declared that they were using services of the TP S.A. network. The remaining units gave other operators: Netia – 5, Centrex –1 and other – 1. The total of 564 users have traditional cord phone sets, while 120 – cordless phones allowed for use in the network in Poland and 33 units use both types of phones. 27 units have two or more numbers and in 4 of them, the additional number is used as the fax number. Tone number selection is used by 75.6% (Fig. 1).

Less than 20% of all units have phone sets equipped in the call-machines (the so called "automatic secretary") and only 5% have fax machines. 280 units (42%) use the telephone line to connect with the Internet, whereas 442 units (67%) employ the telephone line to exchange data with another computer (not via the Internet). On the other hand, 197 units use both of the above functions, while 114 – none of them. The data transmission rates available for the modems found at the disposal of the State Forest units are shown on the enclosed figure (Fig. 2). The most common transmission rate given by organisational units is 56 kbit/s (45.6% of users, who answered this question in the questionnaire). The positive thing is that the slowest transmission rate is used only by a small percentage of users, whereas nearly 22% of them use the ISDN system, which allows a relatively high rate of data transmission.

Cellular telephony

The total number of 634 users have 918 mobile phone numbers, which means that there are 1.4 numbers per one user. 187 units have two or more telephone numbers. The majority (592) of mobiles are office phones (Table 1). Most of the mobile numbers, both office and private, are operated by the ERA network.

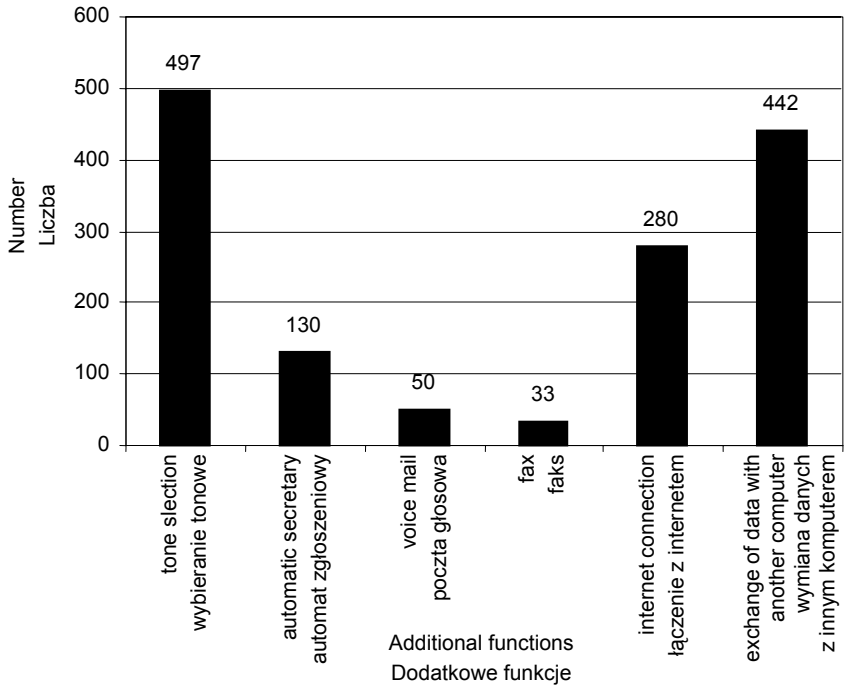

Fig. 1. Additional functions utilized by users of desktop telephones
Rys. 1. Dodatkowe funkcje wykorzystywane przez użytkowników telefonii stacjonarnej

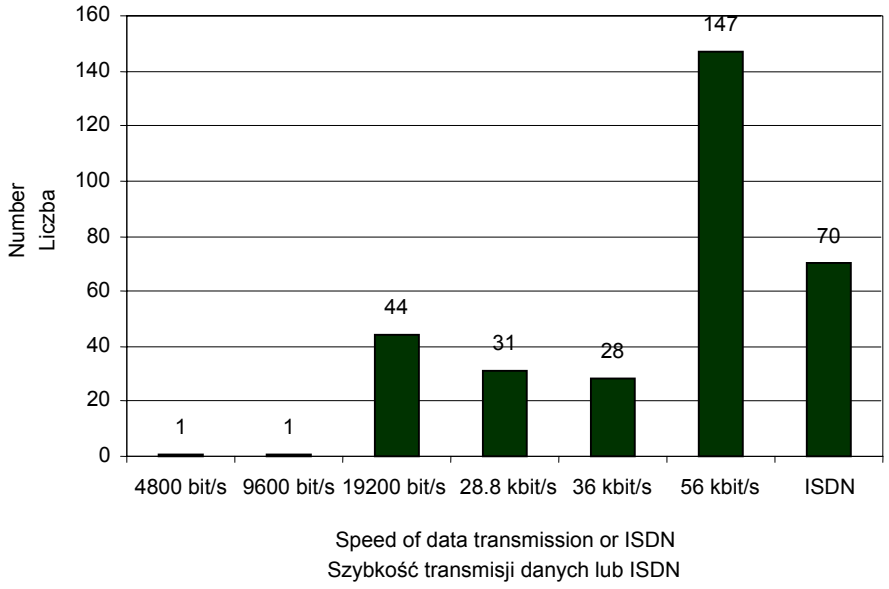

Fig. 2. Speed of date transmission by means of a modem or using ISDN
Rys. 2. Szybkość transmisji danych realizowana przez modem lub wykorzystanie ISDN

Table 1. Amount of numbers of mobile telephones of intividual service providers in possession of interviewed forest units
Tabela 1. Liczba numerów telefonii komórkowej poszczególnych operatorów posiadanych przez ankietowane jednostki

Total amount of numbers Liczba numerów łącznie				Amount of office numbers Liczba numerów służbowych				Amount of private numbers Liczba numerów prywatnych			
ERA	IDEA	PLUS	total razem	ERA	IDEA	PLUS	total razem	ERA	IDEA	PLUS	total razem
648	111	159	918	444	51	97	592	204	60	62	326

The most popular makes of mobile phones registered in the State Forests units are: Nokia (47.6%) and Siemens (33.5%).

The network coverage on difficult areas, including forested regions, can be considered satisfactory. There are, however, places where this coverage is still insufficient. Half of the users reported effective coverage on over 75% of the unit area, while 98 of them (15.5%) – on the whole unit surface. In the case of 122 units (20%), the effective coverage was reported on half of the unit area (Fig. 3).

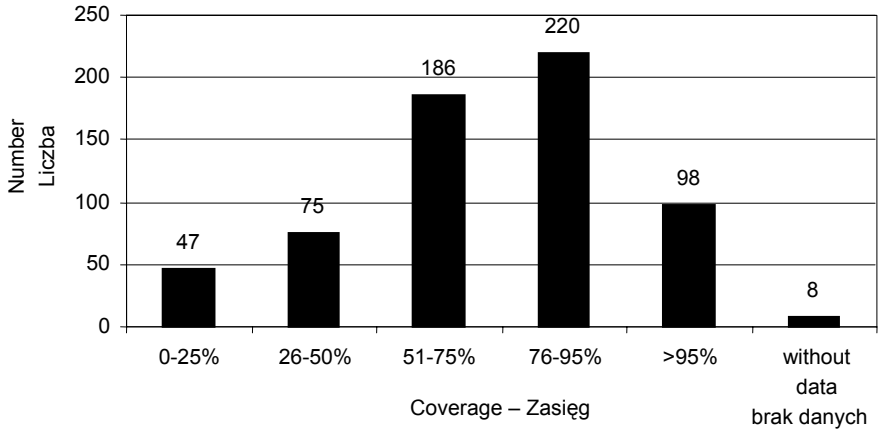

Fig. 3. Effective coverage of mobile phones
Rys. 3. Skuteczny zasięg używalności telefonów komórkowych

94.3% of all the cell phone users described the usefulness of this phone in their work as considerable – referring to its value as essential or necessary. Only two users stated that it was useless.

Radiotelephone communication

Less than half (45%) of those questioned possess radiotelephones. 151 units reported portable radiotelephones, 73 – transportable and 41 – stationary, with 41 having more than one device. The most common makes of the radiotelephone are: Motorola (74) and Yaesu (50).

The most popular make of the transportable and stationary radiotelephone is Yaesu FTL-1011. This model is equipped in a built-in scanning system (for searching through channels) as well as an automatic system of noise suppression combined with a system of selective calls. The construction of this device allows (with the assistance of additional outside modems) expanding the operational options of the radiotelephone by, for example, a system of coded data transmission in the computer network [Rzewuski 1992].

The total of 131 users (43%) reported effective coverage on more than 75% of the unit area but 35% of all the radiotelephone users stated that the effective coverage occurred only on half of the unit area (Fig. 4).

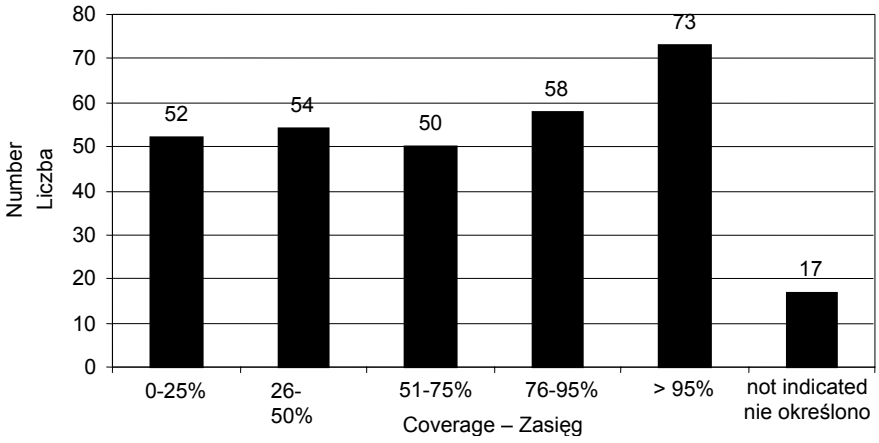

Fig. 4. Effective coverage of radiotelephones
Rys. 4. Skuteczny zasięg używalności radiotelefonów

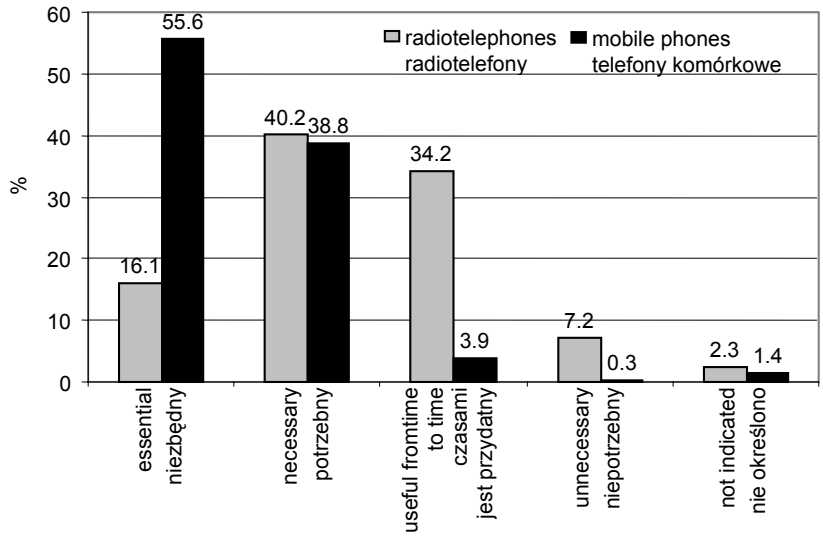

Fig. 5. Comparison of usefulness of radiotelephones and mobile phones
Rys. 5. Porównanie przydatności radiotelefonów i telefonów komórkowych

The majority of the radiotelephone users (72%) stated that they applied the device to a limited extent (sometimes, seldom, and sporadically). Out of all interviewed persons, 55 (18%) declared that they used the device frequently, whereas 23 users (7.6%) – that they do not use radiotelephones at all.

Radiotelephones are used, primarily, for fire protection as well as fire-fighting operations (71%). Other applications of this device included: carrying out various tasks associated with forest economy (22%) and other purposes (hunting economy, forest damages etc.) – 7%.

Of those questioned, 56% described the usefulness of radiotelephones in their work as considerable, i.e. essential or necessary. According to 7% of respondents (22 units), this device is useless. The comparison of the usefulness of radiotelephones and mobile phones for work in forestry is presented on Figure 5.

SUMMING UP

A high proportion of users of desktop telephones utilise their tone selection function. This can be attributed to the fact that the majority of telephone exchanges make this function available and users who switch over to this system can select numbers more quickly. In addition, it also allows realising other automatic options (e.g. checking of the bank account, intercom connections etc.).

Furthermore, a considerable number of users employ the telephone line to exchange data with other computers. This, undoubtedly, is connected with the fact that the telephone line is used to transfer various data (e.g. wood registration, the extraction note, haulage slip, permit for wood delivery) from forest ranges to the forest inspectorate.

Mobile phones obtained a very high rating for their usefulness in forest work. More than half of the respondents (55.5%) stated that they were essential in their work and only 0.3% said that it was dispensable. It is worth stressing here that radiotelephones were described as essential by 16% and as ‘expendable’ – by 7%. This is strongly associated with the frequency of utilisation of radiotelephones, which – in the case of 72% of units were utilised either sometimes, seldom or sporadically and almost 8% of forest units do not use them at all. The proportion of radiotelephone users is not very high (less than half), bearing in mind the fact that that the radiotelephone communication is supposed to constitute the basis of alarm communication. Portable radiotelephones are most common, which is quite understandable as they are more functional during work outdoors than transportable devices. It may be assumed that comfortability and ease of use of cell phones led to the lower usefulness assessment of radiotelephones, despite their obvious advantage in some dangerous situations when, as in the case of forest fires, they are essential communication systems for simultaneous contacts with several recipients at the same time.

Half of the respondents, users of mobile phones and 43% of those using radiotelephones reported the effective coverage on more than 75% of the unit area. This result can be considered good bearing in mind the fact that forested areas are considered as difficult regions to guarantee favourable parameters of the radio signals.

CONCLUSIONS

1. The current system of communication functioning in forestry guarantees each forest unit a good contact.
2. In situations, which are not threatening to the existence of the forest, mobile telephony appears to play the most important role, although its coverage range is not quite satisfactory. It can be assumed that this trend will be maintained for at least several more years.
3. The radiotelephone network is essential in situation of hazards associated with forest fires and other natural disasters. The remaining tasks where radiotelephones are used are of lesser importance.
4. Data transmission takes place employing cable means of communication.
5. Means of communication used in forestry allow sending even large quantities of information.
6. Steady and rapid development of systems of information and communication may impose further development and modernisation of networks operating in forestry.

REFERENCES

Leśnictwo 1995. GUS Warszawa.
Mały Rocznik Statystyczny Polski. 2003. GUS Warszawa.
Pilarek Z., Podwójska J., 1996. Łączność trunkingowa. Przegl. Leśn. 2, 16-17.
Rzewuski T., 1992. Propozycje nowego sprzętu radiotelefonicznego. Biul. Inf. ZOPL 1.
Santorski Z., 1998. Systemy wykrywania pożarów lasu i alarmowania. Mater. Pierwszej Bałtyckiej Konferencji nt. Pożarów Lasu. 5-8 maja 1998, 199-206.
Santorski Z., 2001. Kierunki rozwoju ochrony przeciwpożarowej lasu. Bibl. Leśn. 147.
Wiśniewski W., 2001. Organizacja i technologia gaszenia pożarów lasu. Szkoła Aspirantów PSP Poznań.

ANALIZA STANU POSIADANIA I WYKORZYSTANIA ŚRODKÓW ŁĄCZNOŚCI STOSOWANYCH W JEDNOSTKACH LASÓW PAŃSTWOWYCH I LEŚNYCH ZAKŁADACH DOŚWIADCZALNYCH

Streszczenie. W badaniach przeprowadzonych metodą ankietową zebrano informacje dotyczące środków łączności użytkowanych w jednostkach Lasów Państwowych, oceny przydatności poszczególnych rodzajów sprzętu w pracy oraz oceny stopnia wykorzystania wymienionych urządzeń. W sytuacjach niezwiązanych z zagrożeniem trwałości lasu największe znaczenie odgrywa telefonia komórkowa (94,4% respondentów ocenia przydatność telefonów komórkowych jako niezbędne lub potrzebne). Sieć łączności radiotelefonicznej jest niezbędna w sytuacjach zagrożenia pożarami lasu oraz w innych zdarzeniach klęskowych. Pozostałe zadania realizowane z wykorzystaniem radiotelefonów mają znaczenie drugorzędne. Przesyłanie danych najczęściej odbywa się z wykorzystaniem środków łączności przewodowej. Stosunkowo niewielka liczba respondentów wykorzystuje

dodatkowe urządzenia i funkcje oferowane przez operatorów sieci (np. z faksu korzysta 5%, a z automatu zgłoszeniowego blisko 20%).

Słowa kluczowe: środki łączności, telefonia stacjonarna i komórkowa, łączność radiotelefoniczna

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