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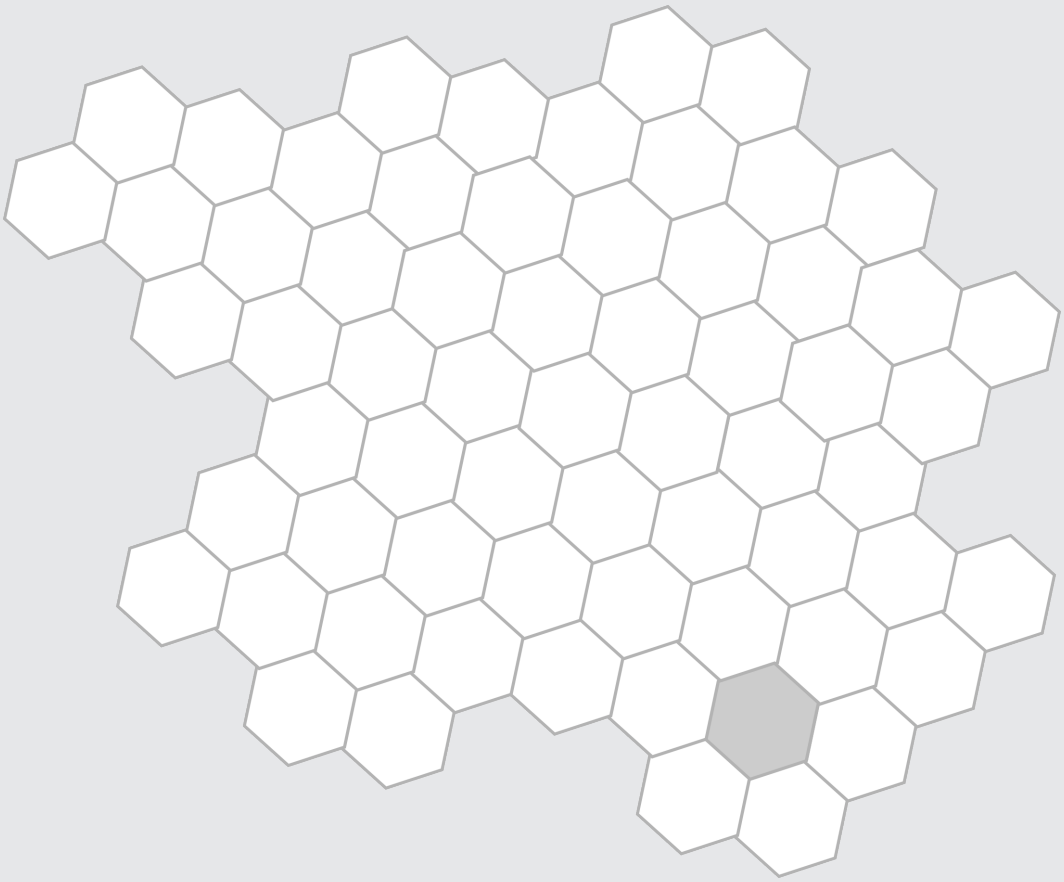

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CB Radio in Road Traffic As Social Network and Information Technology

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Abstract

The aim of this paper is to introduce CB radio, its possibilities when using it as a source of traffic information, and author's empirical experience with long term practical using it. Also to describe a gross draft of plan of research the aim of which will be to check and evidence if CB radio is better than other channels for distributing and gaining traffic information.

Results of the future research can be useful for the next development in traffic information technologies.

Key words

traffic information; social network as information technology; CB radio; CB radio; citizen band; radio; transceivers; road traffic

Biographical note

Martin Adámek is a PhD student who used to work as van driver during his master's studies.

User of CB radio on Czech and Slovak standard since early 1990's and user of CB radio on Polish standard since February 2010. Having two transceivers on the dashboard and three long antennas (one for receiving of common radio broadcasting) on the roof of his car to have as good traffic information as possible.

An Introduction – Entering information about CB radio

Various information technologies are being used as source of traffic information for drivers. Besides the well-known technologies like radio broadcasting with RDS or GPS navigation systems with RDS-TMC, it is CB radio system of transceivers too.

This paper is based on author's empirical long-term (ca. 15–17 years) personal experience with using of CB radio, mainly in road traffic.

CB radio (CB = citizen band, civil band) is standard of transceivers whose using of which is allowed generally for public. Standards are not the same in all countries but in each country a channel (frequency) exists which is reserved for communication between drivers and for sharing traffic information. CB uses radio band around 27 MHz (wave length around 11 metres).

Drivers of many trucks, some vans, few off-road expedition cars, and just rarely of common passenger cars use CB in the Czech Republic. So, CB radio is absolutely unknown technology for the most of Czech people. Approximately the same situation as in the Czech Republic is in Slovakia, whereas CB is installed in many cars, including passenger ones in Poland. So CB radio is well known there. There are three reasons for this big difference between the two neighbour countries:

- Polish police is stricter and has bigger respect from its local citizens than Czech police.
- Polish people have wilder character, Polish drivers are faster and more risking.
- Polish AM CB transceivers are ca. 2 to 3 times cheaper than Czech FM ones.

Comparison of Czech and Polish environment is based on author's knowledge of Poland, on whole-life living on state border with Poland, on studying Polish language and culture, on travelling through Poland, and on this year's one semester study stay in Poland.

Truck drivers in many countries, including non-European, use CB radio – but author of this paper has personal experience with Czech, Slovak and with Polish CB radio only.

Brief history of using of CB radio in the Czech Republic

The way of using CB radio has changed with the time progress.

It was available since the beginning of 1990's of 20th century in Czechoslovakia, when GSM phones were not available, price of NMT phone corresponded to ca. 6 month salaries (charges were high too), and waiting period for a fixed phone line could be up to 3 years, sometimes even with shared line.

So CB radio was being used as communication technology for families, companies, organisations or friends. Emergency channel used to be monitored by EMS, police, or metro police in many Czech towns in this time. It was possible to call EMS to traffic accident by CB (verified).

Whereas today, at the beginning of the 21st century, it is possible to get functioning cell phone free of charge; charges are quite low, modern transceivers on new standard PMR (Personal Mobile Radio; band around 446 MHz; lower price, size, weight, battery consumption, and range) are available for sport, outdoor activities and other events. And many internet services exist for unimportant social cost-free conversation (chatting) between people.

So CB radio is being used already almost by drivers only today. Although it is quite an old technology, it still has its place on dashboards of trucks, in addition to the most modern GPS navigation systems equipped with RDS-TMC input and broadcast radio receivers with RDS.

Reason of persisting popularity of CB between truck drivers is relevance of traffic information.

Technical principles and law conditions

CB radio is being used without repeaters on traffic channels. It means direct transmitting from transceiver to receiver and limited range. Between two cars, it can be 100 m in direct visibility – with broken antenna during high radio traffic; as well as it can be 40 km passing a hill – when good antenna and uncertified amplifier (making power e.g. 100 W instead of allowed 4 W) is used.

Transmission range depends mostly on the position and equipment of transmitting side. So, communication paths (relations) can be directed (oriented) in network of mass CB communication.

A network member has connection with two other members who are not connected mutually. Each state of network and paths is very temporary, it is valid for a definite instant only because summation of speeds of two cars in opposite direction can be ca. 3 km per minute, so conditions are changing quite fast during conversation when cars are going near or departing.

CB transceivers are half duplex. It means that each TransCeiver can be only transmitting or only receiving at any moment. Maximally one station can be transmitting on one channel in one geographic location (range of transmitting station). All other stations on the same channel in the range can be listening. When two or more stations are transmitting too near on the same channel, signals jam and some drivers cannot hear anything while some can hear just the stronger (nearer) station. Group communication ('conference', by phones vocabulary) is big advantage of radios and it is a basic precondition for using radios as social network and information technology. It is not necessary to establish connection between two or more concrete users. When a channel is empty anyone can start transmitting; and everyone who is in the range can hear him immediately. 'Conference' is 'established' immediately without any complicated procedure (dialling, ringing or technical joining), so everyone can add his piece of information or opinion almost immediately. This is the strength of CB in its role of social network and IT.

Various national standards exist. Some stations can just jam each other and not to communicate.

Empirical experience with CB in road traffic

Social network

CB radio, either from the point of view as traffic information technology or as system for group communication is a network of people equipped by transceivers.

Usability of CB radio system depends on people. It is possible to see especially in the Czech and Slovak Republics, where it is being used almost in trucks and few vans only, that it does not operate during weekends when truck driving is prohibited, and on side roads where truck traffic is not present. This can be better in Poland where many passenger cars are equipped with CB (but some level of road traffic is still necessary to cause enough volume of radio traffic).

New term 'social network' has been used quite often in ICT world during the few last years. Although this term is much newer than CB radio it is possible to classify soft system of CB radio and its users as social network (network based and depending on users, on people).

CB has the same problems as other social networks when being used as information technology – human element can bring noise (by unrelated disturbing nonsense communication), false information (by mistake, or misunderstanding) or quite impolite expressions sometimes, too.

Information technology

While common radio broadcasting distribute information about traffic in the whole country or region,

CB radio has limited range (from hundreds of meters to several kilometres). So users are not being disturbed by non-interesting 'information' and can work with real useful information, related to area or road where they are.

Each piece of traffic information has to wait for its dedicated time in broadcast time schedule. So traffic information has big delay in broadcasting. Additionally, many radio stations exist. Whereas each piece of information is distributed immediately at CB band – when adriver sees a radar, accident or another danger, he tells it to other drivers, so delay of transfer of information is few seconds only at CB band, instead of tens of minutes at radio broadcasting.

So CB radio is instant and local in comparison with radio broadcasting and provides much more relevant information.

Additionally, it is possible to ask other drivers for some specific information, needed at a given time (traffic situation in front of the driver, navigation to concrete destination point, petrol station or toll sale, or other local problems).

Each piece of information is turning around in circle in some limited (thus related) area around the place of occurrence of an event. It is being constantly repeated and continuously actualised during the whole period of event validity by new drivers who are coming to that place from all directions.

Because of diversity in the range of transmitting and positions of drivers, a piece of information is forwarded by some driver on demand of an other driver who has heard that the first driver is thanking for receiving a piece of information.

Everything aforesaid ensues from long-term personal empirical experience. Author of this paper has clear opinion about usefulness of CB radio in a car (that is why he uses it – as well as most of truck drivers) but it is necessary to support the hypothesis by hard numbers.

A research about this topic already exists. Research was done by asking 1,200 transport companies in California, USA by Regan and Golob (1999). It shows the same experience – *CB radio is the best way of gaining traffic information for drivers*,

The strength of social network (not depending on used communication technology) as source of traffic information is also confirmed by the same paper from Regan and Golob (1999) – *the best source of traffic information for dispatchers are reports from their drivers on the road*.

Gross concept of plan of research

The aim of this research will be to explore, verify and evidence possibilities and benefits of CB radio as a source of traffic information.

First preliminary research has been already done as part of preparation of this paper during the last months. It has not involved a large statistical sample. The main aim of this research was to try punctual logging of traffic information into the protocol to verify or change the scheme of the form.

Main research

The topic of main research will be to watch float of traffic information on various information channels (sources) simultaneously with the aim to verify speed, quality

and geographic relevance of distributing traffic information by this information channels:

- CB radio (Czech and Slovak traffic channel; Original idea to monitor more national channels was rejected because of too low foreign radio traffic)
- Public radio broadcasting (one full area and one regional station; no information about radars)
- Commercial radio broadcasting (ca. two full area stations and ca. three regional stations)
- NDIC website (official National traffic information centre, source for public radio broadcasting)
- SMS system `radary.cz`

Monitoring can be being done:

- In interesting places (traffic knots; main roads during some traffic event)
- By monitoring of frequency of repeating of the same information
- In various weekdays, in various time, on roads of various size (importance)

Another researches

- Central information service operated in traffic knot (logging of information float into a protocol)
- Watching how many drivers pay fine for speeding have CB antenna
- Watching distance-light signals and gesticulation of oncoming drivers
- Counting vehicles equipped and unequipped by CB antenna, with information about country and category of the vehicle; verifying how many drivers with CB antenna use CB
- Everything for various types (sizes) of roads, various weekdays, various time
- Watching traffic information and comparing it with actual state while driving

Research should show and evidence if CB radio is really as useful as it seems based on empirical experience after ca. 15 years of occasional using it.

Conclusion

CB radio provides much more related information (in aspect of location and time) than radio broadcasting, because it is instant (few seconds) and local (several kilometres). While radio broadcasting has unacceptable time delay (tens of minutes) and place irrelevance (hundreds of kilometres). And information integrity (non-absence of information) is better on CB, too.

But usability of CB radio depends profoundly on type of road and on weekday + time because it depends on truck traffic.

It is necessary to verify empirically drawn conclusions by statistically acceptable way.

Foreign drivers usually respect prohibition of using their radios, so it is not possible to monitor information float on various national CB traffic channels. But

it is possible to compare information float on Czech CB traffic channel with other sources of traffic information.

Acceptable results could serve as inspiration for developers of sophisticated navigation and traffic information systems. It could also prove that people (users) are still quite an important part of the world, and that new traffic information systems could be duplex and could involve users as direct and fast source of information.

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Call for Papers

Papers to be included in the next issue should be preferably focused on topics related to social-networks in one or more of the following subjects (the list is indicative rather than exhaustive):

Sentiment/Opinion Analysis in Natural-Language Text Documents

Algorithms, Methods, and Technologies for Building and Analysing Social Networks

Applications in the Area of Social Activities

Knowledge Mining and Discovery in Natural Languages Used in Social Networks

Medical, Economic, and Environmental Applications in Social Networks

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere. Each of the submitted research papers should not exceed 26 pages. All papers are refereed through a peer review process.

Submissions should be send in the PDF form via email to the following address: `SoNet.RC@gmail.com`

Accepted papers are to be prepared according to the instructions available at `http://www.konvoj.cz/journals/mmm/`.