# Self-induced workload caused by poor communication

**by Peter Hudec**

Workload is very wide term and there are a lot of factors that can affect it. Such as aural/ visual (static and dynamic) information processing, the balance between traffic load and its movements and airspace complexity, the man-made environment (e.g. route structure and working position design and the way a position facilitates actions, for example interacting with radar by means of a keyboard and mouse), relevant change in the natural environment in the form of adverse meteorological conditions such as thunderstorms, fog, icing), co-ordination methods, overall availability of support equipment and many more. But workload can also be influenced by personal variables, such as performance instability arising from age, experience, skill, etc. In this article I am going to address the potential for avoidable increase in communication workload which is sometimes caused by controllers and how this may interact with efficiency and safety.

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became an ATCO in 1983 and an executive supervisor in 2005. He finished his TWR/APP and supervisor operational post at Bratislava, Slovakia at the end of March 2015. Since 1995 he has been working in various positions related to safety investigation and supervision and currently works for the ANSP Safety Division as a Safety Specialist.

Generally, every time we have to repeat something – "say again" – our communication workload is increased. What we could say in a single transmission, now needs repeating once, sometimes twice, sometimes three times, until we achieve an understanding of the transmitted message by the recipient.

This kind of communication workload increase may occur for a variety of reasons:

**In ATC, we often speak more quickly (between 140 and 160 words per minute) than is recommended in ICAO ANNEX 10 Volume II[1].** The Recommendation that "controllers should be encouraged to speak slowly and distinctly", is still valid, but the volume of traffic, efficiency and capacity sometimes encourages us to speak faster, so that work as imagined (WAI) is different from work as done (WAD). This is an increasing problem. In a busy sector, communication blocks recorded by a logging system might look like this:

| Action | Date | Time from | Time to | Duration |
|---|---|---|---|---|
| | 2015-02-24 | 08:43:15 | 08:44:37 | 00:01:22 |
| | 2015-02-24 | 08:45:04 | 08:47:59 | 00:02:55 |

Busy in this context means that those white gaps between transmissions on the frequency are very narrow (just a few seconds), so that the only way you can accommodate more communication without eliminating these gaps altogether is to speak more quickly when you transmit. If you try to accommodate more transmissions by narrowing the gaps between them, you have to be careful not to 'step on' and thus block someone else's message which you are not necessarily expecting.

## Speed of Speech

As we speak faster, we may not be able to pronounce words, letters and numbers with sufficient clarity and thus the recipient does not correctly understand the message. This problem can be aggravated when it is combined with the effects of a local accent unfamiliar to the recipient. The result will be a higher probability that we will hear requests for repeat or get a wrong readbacks from pilots that will have to be corrected. We may even not detect such wrong readbacks – but that is another story.

## Phraseology

From time to time some controllers use non-standard phraseology "to save words and time" so as to be more efficient, which can have the opposite

1 - Paragraph 5.2.1.5: "Transmitting technique", Paragraph 5.2.1.5.2: "Transmissions shall be conducted concisely in a normal conversational tone, a) enunciate each word clearly and distinctly; b) maintain an even rate of speech not exceeding 100 words per minute. A slight pause preceding and following numerals makes them easier to understand; c) maintain the speaking volume at a constant level"; etc.

## Self-induced workload caused by poor communication (cont'd)

effect when they subsequently have to repeat a transmission that was not understood due to an incorrect or unexpected format such as leaving out the word "decimal" in a frequency change. Some examples of time lost merely by the latter are shown in EXAMPLES A,B, C.

**Some ATCOs use numbers within a single message for more than one purpose** – clearances to climb or descend together with frequency changes[2]. This increases clearance complexity and may lead to wrong readbacks or requests to repeat. This is mostly because of the need to get the job done very quickly doing two things together saves transmission time by avoiding the need to address the same flight twice I quick succession. The Recommendation: "Controllers should be encouraged to keep their instructions short" also supports the separation of such instructions.

The more complex a message is, especially if it contains a lot of numbers, the higher the probability that a wrong readback will occur. Sometimes such a readback error may not be picked up and a loss of separation may follow. Examples of this creating additional workload shown on D and E.

| EXAMPLE A |
|---|
| **Controller:** XYZ6KH resume own navigation, contact Bugen 13289, good bye |
| **Pilot:** 132 decimal 9, good bye, XYZ6KH. |
| **Controller:** Decimal 89 and resume own navigation. |
| **Pilot:** 128 decimal 9 and resume navigation XYZ6KH. |
| **Controller:** 132 decimal 890. |
| **Pilot:** 132 decimal 890 XYZ6KH. |

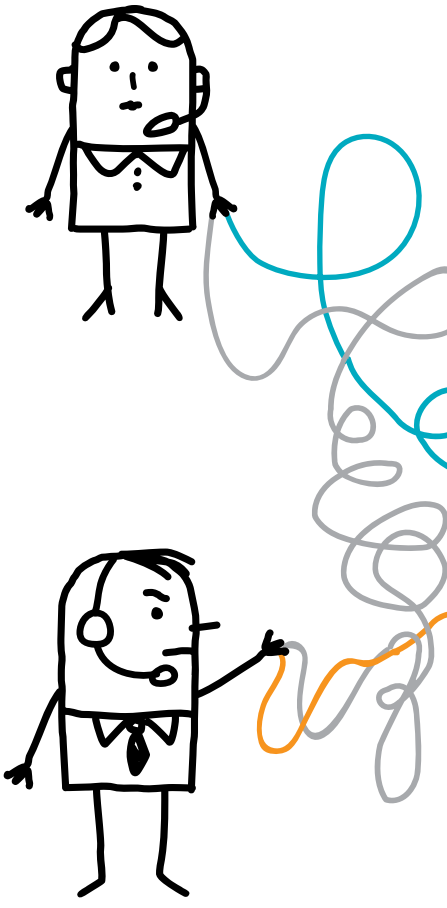
*Note that saving the one word 'decimal' led to the use of 37 additional ones.*

| EXAMPLE B |
|---|
| **Controller:** XYZ7343 12037 good bye. |
| **Controller:** XYZ7343? |
| **Pilot:** XYZ7343, go ahead sir. |
| **Controller:** 12037 good bye. |
| **Pilot:** Say again the frequency, XYZ7343. |
| **Controller:** 12037. |
| After 40 seconds:<br>**Pilot:** Sorry sir, you have confused us, XYZ7343.<br>Can you say slowly the frequency? |
| **Controller:** 120 decimal 375. |
| **Pilot:** 120375 thank you, XYZ7343. |

*Note that saving the one word 'decimal' led to the use of 58 additional ones.*

| EXAMPLE C |
|---|
| **Controller:** XYZ361 contact Bugen Radar 132890 good bye. |
| **Pilot:** Say the frequency again for XYZ361. |
| **Controller:** Frequency 132890, ahoj. |
| **Pilot:** 13890, XYZ361. |
| **Controller:** Negative sir, 132 decimal 890. |
| **Pilot:** 132 decimal 890 for XYZ361. |

*Note that saving the one word 'decimal' led to the use of 35 additional ones.*



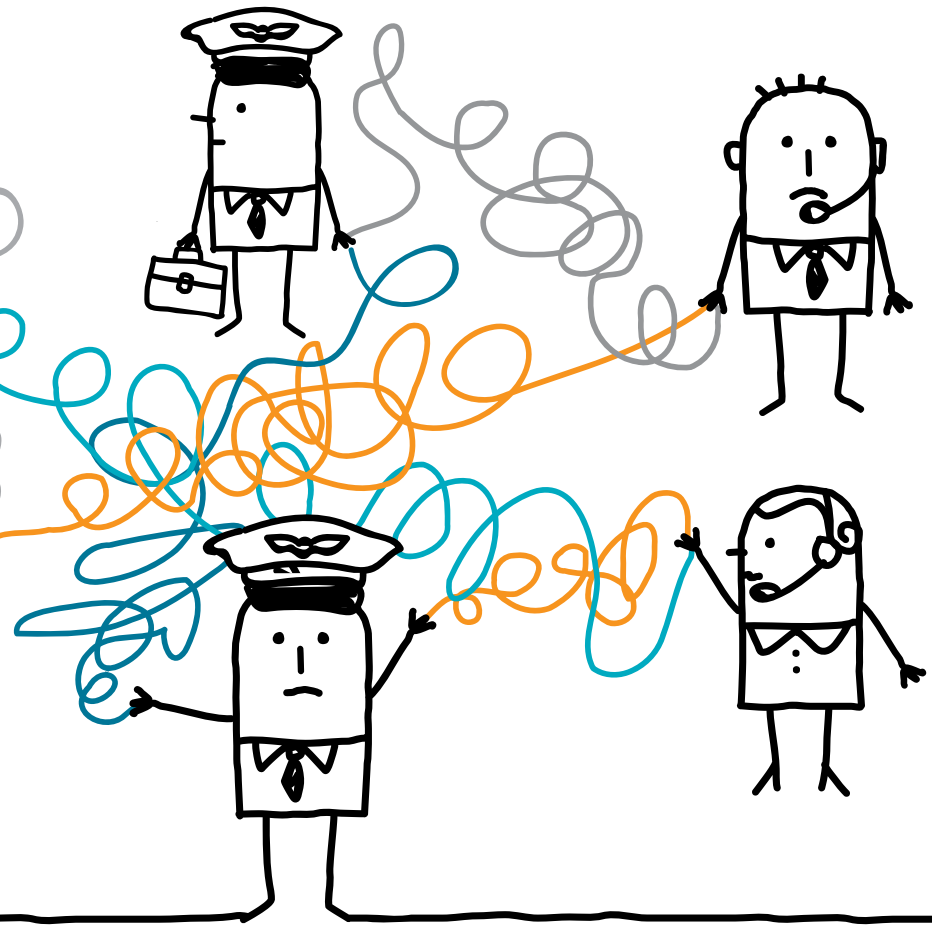
**2 - This is not consistent with the Recommendation in the "European Action Plan for Air Ground Communications Safety" Part 5.2 "Best practice for ATCOs", Paragraph 5.2.1.1 which says "Do not pass RTF frequency changes as part of a multi-part clearance".**

| EXAMPLE D |
|---|
| **Pilot:** XYZ829, request descent. |
| **Controller:** XYZ829 descent to FL290, change Radar 134 decimal 475, good bye. |
| **Pilot:** Descending FL270, change frequency 134 decimal 475. |
| **Controller:** 290 flight level and 134 decimal 475. |
| **Pilot:** Descending FL29 and 134 decimal 475, XYZ829. |

*Note that saving the one word 'decimal' led to the use of 28 additional ones.*

| EXAMPLE E |
|---|
| **Controller:** XYZ2347, Bugen? |
| **Pilot:** XYZ2347, go ahead. |
| **Controller:** Contact Willy 120 decimal 550 and descend to FL120. |
| **Pilot:** 120550, descending level 100, XYZ2347. |
| **Controller:** Descend to FL120. |
| **Pilot:** Say again? |
| **Controller:** Descend only to FL120. |
| **Pilot:** Sorry, descending FL120, XYZ2347. |

*Note that saving the one word 'decimal' led to the use of 33 additional ones.*



3 **Some controller transmissions are not easily readable because of their improper use of the microphone/headset** – yet another reason for having to repeat the message.

So you can see that any communication that is not understood by the recipient can needlessly increase workload both directly (more time used for a task) and indirectly (less time for other tasks). It can even create work itself – more time spent focusing on pilot readback – your hearback) means more active listening. And effective active listening always requires effort and energy.

At the beginning, we saw that saving words could be seen as saving time so as to be more efficient but I hope that now we appreciate that the result of such action can have the opposite effect. Time is our friend – it can work for us – but it is also our enemy – it can work against us when things are not going as planned. And it is not only just a matter of increased workload because the delivery of operational safety can be affected too. It seems there is a relationship between **workload** (in this case communication workload), **efficiency** and **safety**. Therefore communication has to be used very wisely to keep these three factors in balance as time passes and circumstances change.