BENEFITS OF QNH OVER QFE

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Key words: *pressure, air traffic, aerodrome, dispatcher, crew, aircraft.*

QNH NING QFE DAN USTUNLIGI

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Kalit so‘zlar: *bosim, havodagi harakat, aerodrome, dispatcher, ekipaj, havo kemasi.*

The urgency of the issue makes it necessary to analyze the problems and errors faced by flight and control personnel when applying QFE and QNH pressures. The symbol QNH is used by aviation for the pressure in the area of the airfield, reduced to the average sea level according to the standard atmosphere, and the designation QFE is used for the pressure at the threshold of the runway (runway). For flights on air routes, the concept of "flight level" is used. This term refers to the surface of constant atmospheric pressure, attributed to the established pressure value of 760 mmHg (1013.2 hPa). The installation of the same pressure on barometric altimeters on all air lines by all aircraft without exception creates a single reference system for all, allowing safe air traffic. There are some differences in the use of QFE and QNH pressures, which are related to the features of aircraft equipment. When taking off and landing on the altimeter of domestic aircraft, the atmospheric pressure is set at the level of the runway threshold (QFE), and when the aircraft is on the runway, the altimeter shows altitude 0. In most other countries, the altimeter is set to the pressure brought to sea level (QNH), that is, the altimeter shows the altitude above sea level. However, in any case, shortly after takeoff, the crew sets a standard pressure of 760 mmHg (or 1013.2 mb). [1]

The main criterion in this issue of transition to one pressure is safety. For example, a feature of using QFE at mountain airfields is that often the altimeter setting scale is not enough to set the value of the desired QFE. In these cases, you have to install QNH. Such a solution was described even in the main Soviet aviation document – NPP GA-85. The risk of a collision with

the ground is also reduced in the event of a non-rearrangement of the pressure on the transition echelon or its erroneous installation, because the difference between QNH and the standard pressure of 1013 hPa is usually much smaller than between 1013 hPa and QFE, which still contains the excess of the airfield. As a result of erroneous altimeter settings, a number of plane crashes occurred (IL-76 in Leninakan in 1988, Yak-40 in Irkutsk in 1988, IL-62 in Havana in 1977, An-12 in Yerevan in 1989), another disadvantage of using QFE in large nodal areas where there are several nearby airfields, The fact is that aircraft actually located in the same airspace use different values to set the altimeter. As additional factors, aircraft following the routes of local air lines (LAL) and below the lower safe echelon are added, which fly along the QNH of the area, while being in close proximity to aircraft flying along the QFE of the airfield. In the case of using QNH at airfields, the difference between the QNH of the airfield and the QNH of the area would usually be insignificant and would not pose a threat to flight safety. In addition to the above problems, the use of QFE leaves its mark on the work of dispatchers. When flying in airspace, at the first permission to descend below the transition echelon, the aircraft give data for installing an altimeter, at the moment the dispatcher must give the relative altitude of descent and pressure QFE, while when flying below the transition echelon, the crew can use both QFE and QNH. As statistics show, about 90% of aircraft crews use this opportunity and perform flights on QNH, and, accordingly, must set the value of absolute altitude and QNH. In practice, the following paradox occurs: the dispatcher says one altitude and pressure, the crew confirms everything and sets a completely different altitude and pressure. The crew takes the QNH pressure from the ATIS broadcast, it is obvious that a situation in which the dispatcher gives some values, and the crew sets completely different ones at its discretion, cannot contribute to improving flight safety. It is also worth noting that the described situation, when the dispatcher gave the QFE value, and the crew confirmed it, he himself correctly set the QNH and the absolute altitude, is ideal, but most often it is done by the crews of domestic airlines who are accustomed to this order. In practice, there are many problems with foreign or less experienced crews. The most common mistake among the flight crew is the incorrect setting of one of the parameters – altitude or pressure. Intending to perform a QNH approach, the crew sets the QNH value when lowering, but at the same time, the crew mistakenly counts the height relative to QFE on the altitude sensor (this usually happens automatically, due to inattention, ignorance of local features, little experience of QFE approaches, etc.), while continuing to

perform a QNH descent. Naturally, with such parameters, the aircraft will be below the height allowed for it, which can lead to a violation of the intervals, a decrease below the minimum safe height, and the operation of the collision warning system with the ground. The reverse version of this error is also noted, when, taking the correct height from the translation table, the crew enters the pressure that the dispatcher told him. [2] Such errors are most often manifested in heavy traffic, when the dispatcher issues a lot of commands regarding the course, speed, as well as with repeated changes in altitude. All this increases the load on the crew, who are already at the most crucial stage of the flight and must, among other things, perform a number of standard procedures for entry. In such an environment, when the dispatcher constantly issues a new height, which must not just be set, but first recalculated, as well as with possible changes (for example, the dispatcher may give a new pressure that requires adjustments from the crew), fatal errors may occur, leading to dangerous situations. Another factor complicating the maintenance of air traffic by QFE is that – in accordance with the procedure for radio communication – the dispatcher must obtain a receipt from the crew for his instruction; in this case, it is not always easy. After indicating a descent from the dispatcher, crews are often asked to inform them of the QNH value, and then in the receipt confirm the QNH and the descent to relative altitude. In this case, the dispatcher faces the question: should the crew confirm the value of QFE, which the crew does not need, and which he is not going to set, or skip it, actually violating the rules of radio exchange. The dispatchers' work technologies in these situations do not reflect reality and cannot really help. According to technology, the crew is given heights in feet and QNH only after its request, which in practice happens very rarely; there is also a requirement to transfer the crew exceeding the runway threshold. Such information puts the crew at a dead end, because it is not clear what to do with it, and why the dispatcher gives it to him, because the crews do not carry out any calculations in practice, and all data is taken from the approach schemes. [2] [3] An additional load may arise in the case of a crew report that it performs a QNH call. At the same time, the Circle dispatcher is obliged to inform the Tower dispatcher about this, although in fact, all aircraft enter by QNH, and there is no difference in the height count for the Circle and for the Tower. All of the above factors turn the simple entry procedure itself, which should be limited to a couple of instructions and confirmations, into excessive radio exchange, air loading, additional remote operations and approvals, thereby reducing the bandwidth of the sector and increasing the

load on the crew and dispatcher. This negatively affects the quality of the service provided, reduces mutual understanding between dispatchers and aircraft crews, while increasing the number of incidents in the area of responsibility of the Circle dispatchers. Having considered possible errors when using QFE, it can be concluded that the need to switch to QNH is not just a planned step towards the transition to a new level of air traffic services, but a required measure to improve flight safety. Standardization of QNH use procedures worldwide will have a positive impact on the level of flight safety. [4]

RESOURCES:

1. Информационное письмо о переходе на использование давления, приведенного к среднему уровню моря по стандартной атмосфере (QNH) от 8 апреля 2015. 2015. 6 с.

2. Сборник аэронавигационной информации Российской Федерации от 4 марта 2014 г. // Книга 1. 2014. 34 с.

3. Отчет по научно-исследовательской работе, содержащий оценку безопасности принятого варианта решения по переходу на QNH от 5 апреля 2014 г. 70 с.

4. Наставление по производству полетов в гражданской авиации СССР от 8 апреля 1985 г. 200 с. 8 Журнал «Трибуна ученого» Выпуск 12/2020 http://tribune-scientists.ru 5. Приказ Минтранса РФ от 26 сентября 2012