



Ophthalmological standards in occupational medicine – a comparison of the Polish and British models based on selected current examples

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ABSTRACT

A correct vision is necessary for a good performance in many professions. Whether the job involves driving a vehicle, quality control, sorting by colour in a manufacturing plant or making critical life-or-death decisions, having good vision is usually fundamental for efficient and safe performance. That is why developing the minimum ophthalmologic criteria required of employees is crucial in almost every position. In Poland, there are no singular guidelines collected on this subject. The information is scattered among ministerial ordinances (from the Minister of Health, Minister of Internal Affairs and Administration, Minister of Infrastructure and Development and even Prime Minister) or

recommendations of Occupational Medicine Centers. In contrast, in the United Kingdom, The Royal College of Ophthalmologist has developed its own ophthalmological standards for employees in many positions. This article serves as a comparison of Polish and British models in terms of current occupational ophthalmologic standards. Standards for firemen, train drivers and other rail workers and for seafarers, especially sailors, were used. The most important eye functions such as visual acuity, visual field, colour vision and binocular vision were considered. The results are collected in the tables.

KEY WORDS: fireman, train driver, seafarer, visual acuity, visual field, colour vision.

INTRODUCTION

Every country is unique. Admittedly, all countries have their own territory and population, their own authorities, and their distinctive laws and practices. Country-specific customs cover many areas of life: from what is regarded as culturally acceptable behavior to heroic deeds, from a complex legislative system to simple health requirements applicable to employees. Indeed, each country also has its specific guidelines for the minimum health criteria (including the field of ophthalmology) that must be demonstrated by employees in certain positions [1-5]. In Poland, these standards are frequently set out in ministerial regulations [6-9]. Accordingly, the minimum eyesight requirements which must be met by firefighters are laid down in the Regulation of the Minister of the Interior and Administration of 11 October 2018 on the list of diseases and disabilities along with the categories of fitness to serve in the Police, Border Guard, Marshal's Guard, State Fire Service, and State Protection Service. Similar requirements applicable to train drivers are included in the Regulation of the Minister of Infrastructure and Development of 10 February 2014 on the

train driver's license; and to seafarers – in the Regulation of the Minister of Health of 9 December 2015 on the health conditions required from seafarers to perform work on seagoing vessels [6-8]. In the UK, the certification system appears to be far simpler. Occupational visual standards for the professions listed above (and many others) can be found in relevant publications of the Royal College of Ophthalmologists [10, 11].

DISCUSSION

Poland's current legislation includes the Regulation of the Minister of the Interior and Administration of 11 October 2018 on the list of diseases and disabilities along with the categories of fitness to serve in the Police, Border Guard, Marshal's Guard, State Fire Service, and State Protection Service (Journal of Laws 2018, item 2035) [6]. Pursuant to the Regulation, three categories of fitness to work in the State Fire Service are identified:

- Category A – fit for service,
- Category B – fit for service with restriction,
- Category C – unfit for service.

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A detailed list of diseases and disabilities which are taken into consideration in the assessment of physical and mental fitness to work in the State Fire Service is given in Table I [6, 12].

The visual standards required of firefighters in the UK in line with the recommendations of the Royal College of Ophthalmologists are listed in Table II [10, 11, 13].

The visual standards applicable to firefighters in Poland are considerably more elaborate and, with a degree of simplification, they can also be assumed to be more restrictive than the corresponding requirements in place in the UK. For example, a person with corrected visual acuity of 0.7 in the better eye (measured by Snellen chart) cannot be a firefighter in Poland, whereas in the UK they would face no obstacles in pursuing this profession. In addition, Polish firefighters must have normal mesopic vision, and the majority of choroidal and retinal conditions, as well as glaucoma [6, 10-13], are considered as disqualifying factors.

The health requirements which are currently enforced with regard to train drivers in Poland are laid down in the Regulation of the Minister of Infrastructure and Development of 10 February 2014 on the train driver's license (consolidated

text: Journal of Laws 2019, item 2373). The detailed vision requirements that should be satisfied by individuals applying to receive or renew their train driver's license are shown in Table III [7].

The visual standards required of train drivers in the UK in accordance with the guidelines elaborated by the Royal College of Ophthalmologists are listed in Table IV [10, 11].

The minimum visual standards required of train drivers in Poland are less liberal than in the UK, and the visual examination itself is more thorough. Again, an individual with corrected visual acuity of 0.7 in the better eye (measured by Snellen chart) in the UK may be a train driver (also an underground train driver), whereas in Poland this would not be permitted. Additionally, train drivers in Poland must demonstrate normal contrast sensitivity and perform the glare test correctly [7, 10, 11].

The eyesight requirements applicable to working on ships in Poland are set out in the Regulation of the Minister of Health of 9 December 2015 on the health conditions required from seafarers to perform work on seagoing vessels (Journal of Laws 2015, item 2105) [8]. In order to facilitate medical

Table I. Eyesight requirements for working in the State Fire Service in Poland

Eyesight requirements for firefighters in Poland				
Section	Item	Diseases and disabilities	Fitness categories	
			Candidates	Officers
7	1	Uncorrected visual acuity in each eye between 0.9 and 1.0	Fit	A
	2	Visual acuity in one eye less than 0.5 and in the other eye more than 0.5. Corrected to 0.9-1.0 with eyeglasses or contact lenses. Maximum allowed correction value ± 4 D sph and 2 D cyl	Fit/unfit	B
	3	Visual acuity in each eye less than 0.5. Corrected to 0.9-1.0 with eyeglasses or contact lenses. Maximum allowed correction value ± 4 D sph and 2 D cyl	Unfit	B
	4	Visual acuity in each eye less than 0.5. Corrected to 0.8-1.0 with eyeglasses or contact lenses. Correction to over ± 4 D sph and 2 D cyl	Unfit	B
	5	Visual acuity in each eye less than 0.5. Eyeglasses or contact lenses fail to correct visual acuity in at least one eye to a minimum of 0.8	Unfit	C
8	1	Blindness in one eye or loss of at least one eye	Unfit	C
9	1	Deficient or lack of binocular vision	Unfit	B
10	1	Mild impairment of color discrimination (with normal discrimination of basic colors)	Fit	A
	2	Severe impairment and complete loss of color discrimination	Unfit	C
11	1	General visual field abnormalities	Unfit	B/C
12	1	Mesopic vision abnormalities	Unfit	B
13	1	Diseases of the orbits, eyelids, conjunctiva, sclera or lacrimal system causing impaired ocular function	Unfit	B/C
14	1	Diseases of the cornea, iris, ciliary body, lens, and vitreous body causing impaired ocular function	Unfit	B/C
15	1	Diseases of the choroid, retina, and optic nerve causing impaired ocular function and/or reducing the capacity to engage in physical activity	Unfit	B/C
16	1	Borderline or slightly elevated IOP	Fit/unfit	B
	2	Glaucoma	Unfit	B/C

Table II. Eyesight criteria applicable to firefighters in the UK

Eyesight requirements for firefighters in the UK		
Uncorrected distance visual acuity	6/18 in the better eye; 6/24 in the worse eye	
Corrected distance visual acuity	6/9 in both eyes; 6/12 in the worse eye	
Acceptable correction of distance vision	Hyperopia	+3.0 D
	Myopia	No restrictions (however, the uncorrected visual acuity requirement must be met)
Near visual acuity	Not specified but necessary for safe operation of the equipment (breathing apparatus indications – N12; radio buttons – N6)	
Laser visual correction	At least one year after the procedure; discontinuation of all medications related to the surgery (except for lubricant eye drops); no postoperative complications (in particular central corneal haze); postoperative refraction, corneal topography and pachymetry (exclusion of corneal ectasia) required	
Visual field	Normal in each eye (confrontational method)	
Color vision	Normal trichromats	Acceptable
	Monochromats	Disqualified
	Dichromats	Disqualified
	Anomalous trichromats	Professional testing is required (typically, protanomaly is a disqualifying factor and deuteranomaly is acceptable)

Table III. Eyesight requirements for train drivers in Poland

Eyesight requirements for train drivers in Poland	
Distance visual acuity in candidates	Uncorrected: each eye ≥ 0.8
Distance visual acuity for license renewals	Uncorrected: each eye ≥ 0.5 or better eye ≥ 0.7 and worse eye ≥ 0.3
	Corrected: each eye ≥ 0.8 or better eye ≥ 1.0 and worse eye ≥ 0.5
	Acceptable correction ± 3.0 D sphere; ± 2.0 D cylinder
Near and intermediate visual acuity	Normal (unrestricted correction)
Color vision	Normal (tested by Ishihara plates)
	Correct identification of color signals (individual colors)
Visual field	Normal
Binocular vision	Normal
Contrast sensitivity	Normal
Glare test	Normal
No visual impairment despite a diagnosis of ocular condition	

certification, workers on seagoing vessels have been divided into three groups:

- group I – masters, deck officers and ratings who are required to assume watch-keeping duties;
- group II – all mechanical engineers, marine electro automation officers, marine electricians, ratings and other crew members forming part of the engineering watch;
- group III – radio operators.

The detailed conditions for the visual medical examination in seafarers are shown in Table V [8, 14].

Table IV. Eyesight criteria applicable to train drivers in the UK

Eyesight requirements for train drivers in the UK	
Uncorrected distance visual acuity	Both eyes $\geq 3/60$
Corrected distance visual acuity	$\geq 6/9$ in the better eye and $\geq 6/12$ in the worse eye
Type of visual correction	Quantitatively unlimited
	Eyeglasses – bifocal glasses are permitted (progressive are not); tinted or photochromic lenses are prohibited; sunglasses are permitted provided that they are compliant with the BS EN 1836 standards.
	Contact lenses – tinted type is not permitted; good tolerance in the place of performing professional duties is required together with assurance that the nature of the work is suitable for the use of contact lenses; a spare pair of eyeglasses of equivalent prescription is required
Near and intermediate visual acuity	N8 required to ensure correct interpretation of written materials during the performance of job duties
Color vision	Normal (tested by Ishihara plates, no more than three errors allowed)
Visual field	Normal (confrontational method)
Laser correction of myopia is a disqualifying factor	
No pathological eye conditions likely to cause visual impairment	

The visual standards required of seafarers in accordance with the guidelines recommended by the Royal College of Ophthalmologists are listed in Table VI [10, 11, 15].

Table V. Eyesight requirements for seafarers in Poland

Eyesight requirements for seafarers in Poland			
	Group I	Group II	Group III
Uncorrected visual acuity	Each eye ≥ 0.1	Each eye ≥ 0.1	Each eye ≥ 0.1
Corrected distance visual acuity	Each eye ≥ 0.5 , but ≥ 0.7 in the better eye is recommended	Each eye ≥ 0.4 ; both eyes ≥ 0.4	Each eye ≥ 0.4
Near visual acuity, both eyes, corrected or uncorrected	Vision required for ship navigation (e.g. reading charts and navigational instruments)	Vision required to read instruments, operate equipment, and identify systems/components	Vision required to read instruments, operate equipment, and identify systems/components
Type of visual correction	Eyeglasses or contact lenses (with a mandatory requirement to have a spare pair in an easily accessible place)	Eyeglasses or contact lenses (with a mandatory requirement to have a spare pair in an easily accessible place)	Eyeglasses or contact lenses (with a mandatory requirement to have a spare pair in an easily accessible place)
Color vision	Normal (no errors on Ishihara plates). In the case of misreading, a correct result obtained by a denominational method, e.g. Holmes-Wright lantern, or by anomaloscopy (Nagel or equivalent).	Normal (no errors on Ishihara plates). In the case of misreading, a correct result obtained by a denominational method, e.g. Holmes-Wright lantern, or by anomaloscopy (Nagel or equivalent), or a correct result in Farnsworth D15 test.	Normal (no errors on Ishihara plates). In the case of misreading, a correct result obtained by a denominational method, e.g. Holmes-Wright lantern, or by anomaloscopy (Nagel or equivalent), or a correct result in Farnsworth D15 test.
Visual field (confrontational method, perimetry in justified cases)	Normal	Sufficient for duties	Sufficient for duties
Mesopic vision	Normal	Normal	Normal
Glare sensitivity	Normal	Normal	Normal
Diplopia	No significant changes	No significant changes	No significant changes

On the other hand, the visual standards applicable to seafarers in the UK are more restrictive than in Poland. Let us again consider an individual with corrected visual acuity of 0.7 in the better eye (measured by Snellen chart). In Poland, such a person may become a deck officer, while in the UK this will not be permitted. Even though the ophthalmic examination performed in seafarers in Poland seems more detailed in scope, it needs to be added that mesopic vision and glare tests are required only in specific situations, e.g. in individuals with implanted intraocular lenses, after laser vision correction surgery or for other reasons related to medical examination [8, 10, 11, 14, 15].

CONCLUSIONS

Firefighters, seafarers, train drivers – the development of occupational visual standards applicable to these profes-

sions in Poland requires as many as three different regulations and the involvement of as many government ministers. This is a lot – in fact, way too many. In the UK, a single set of guidelines has been proposed by the Royal College of Ophthalmologists to address this problem. Is this insufficient? No, clearly it is perfectly enough. Perhaps it would be worthwhile to take a leaf out of the book of proven methods? Maybe some of the solutions should be communicated to the Polish Ophthalmological Society? As Antoine de Saint-Exupéry used to say: “We often come up with ideas, but far less commonly with solutions”.

DISCLOSURE

The author declares no conflict of interest.

Table VI. Eyesight criteria applicable to seafarers in the UK

Eyesight requirements for seafarers in the UK			
	Deck officers	Engineers, mechanics, radio department personnel	Others
Uncorrected distance visual acuity	Each eye \geq 6/60	Each eye \geq 6/60	Required for the efficient performance of duties
Corrected distance visual acuity	Better eye \geq 6/6; worse eye \geq 6/12	Each eye \geq 6/18	Required for the efficient performance of duties
Near visual acuity, both eyes, corrected or uncorrected	N8	N8	Required for the efficient performance of duties
Type of visual correction	Eyeglasses or contact lenses. Bifocal glasses are acceptable, as long as there is good adaptation; tinted glasses are recommended when there is a problem with glare sensitivity. Mandatory requirement to have a spare pair of eyeglasses or contact lenses in an easily accessible place.		
Color vision	Correct Ishihara or Lantern 2 test result	Correct Ishihara or Farnsworth D15 or City University test	Required for the efficient performance of duties
Visual field (confrontational method, perimetry in justified cases)	Correct (\geq 120° range in the horizontal, no defects within 20° of fixation) Homonymous (hemianopic or quadrantopic) defects are disqualifying factors	Required for the efficient performance of duties	Required for the efficient performance of duties
Monocularity	Visual acuity in the better eye: uncorrected \geq 6/60; corrected \geq 6/6	Visual acuity in the better eye: uncorrected \geq 6/60; corrected \geq 6/9	Required for the efficient performance of duties
Acceptable only in seafarers who have become monocular	A sufficient period of adaptation to monocular vision is necessary to enable stairs to be descended rapidly and safely; no signs of progressive disease in the other eye		
Diplopia	Not acceptable		
Nyctalopia, retinitis pigmentosa	Not acceptable		

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