

# Assessment of the energy expenditure of soldiers of the Representative Battalion of the Polish Army during three days of drill training as part of preparations for the celebration of the National Independence Day of November 11<sup>th</sup>

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## Summary:

**Introduction:** The main mission of the Representative Battalion of the Polish Army consists of stately representation of the Polish Army during state celebrations, various state and military holidays or patriotic and religious events, as well as performing representative tasks at the Presidential Residence or during official visits hosted by the Prime Minister.

**Aim of the work:** The objective of this study was to assess the energy expenditure of soldiers during a three-day grill training as part of preparations for the celebration of the National Independence Day of November 11<sup>th</sup>.

**Methods:** The measurements were made on the basis of systolic heart rate as recorded by Polar Sport Tester 810 pulse meters. The energy expenditure was calculated from the relationship between the systolic heart rate and oxygen consumption.

**Result:** The mean energy expenditure of tested soldiers was  $4.93 \pm 1.59$  kcal/min.

**Conclusion:** Energy expenditure of soldiers during 7 hours of effective drill training as part of preparations for the celebration of the National Independence Day of November 11<sup>th</sup> was different and allowed the workload to be classified as light to very heavy.

**Key words:** energy expenditure, Representative Battalion of the Polish Army, military service.

## Introduction

Current history of the representative units of the Polish Army dates back to 1944. In that year, on September 14<sup>th</sup>, the first post-war Warsaw Garrison Headquarters was established in the Praga district. The headquarters fulfilled representative and garrison tasks which were later taken over by the Warsaw Garrison Command.

As a result of organizational changes in the structure of units under the Warsaw Garrison

Command, the Capital City of Warsaw Garrison Headquarters, including representative subunits, was disbanded as of December 31<sup>st</sup>, 2000. The representative tasks were taken over by the Representative Battalion of the Polish Army. The new unit became operative as of January 1<sup>st</sup>, 2001. The newly formed unit consisted of three Representative Companies of the Polish Army, the Polish Armed Forces Representative Band, a salute platoon, a protection company and staff. Starting from January 1<sup>st</sup>, 2009, the

Battalion comprises also a Cavalry Squadron of Polish Armed Forces as a mounted representative subunit.

The main mission of the battalion consists of stately representation of the Polish Army during state celebrations, various state and military holidays or patriotic and religious events, as well as performing representative tasks at the Presidential Residence or during official visits hosted by the Prime Minister [1].

Every year, soldiers of the battalion provide ceremonial setting to ca. 1200 events, mainly state, military, or patriotic and religious celebrations both home and abroad, as well as perform the guard of honour duties at the Tomb of the Unknown Soldier and the Presidential Palace. Representative Battalion soldiers are well-known for their mastery of parade drill, presented to much acclaim during state and military holidays, band festivals or other events.

The objective of this study was to assess the energy expenditure of soldiers during a three-day drill training as part of preparations for the celebration of the National Independence Day of November 11<sup>th</sup>.

## Material and methods

The study was conducted in 22 soldiers serving in the Representative Battalion of the Polish Army. The energy expenditure was measured over three days of intense drill training taking up 8 hours per day. The measurements were made on the basis of systolic heart rate as recorded by Polar Sport Tester 810 pulse meters. The energy expenditure was calculated from the relationship between the systolic heart rate and oxygen consumption. The energy expenditure was measured in soldiers performing different ceremonial tasks under weather conditions consisting of the air temperature of 7–9 °C and drizzle precipitation.

## Results

The average age of the tested soldiers was 25.3±2.5y, ranging from 22 to 31 years. Mean height of the soldiers was 182.7±3.7 cm (176–191 cm), while mean body weight was 87.9±7.5 kg (67–101 kg).

**Table 1:** Energy expenditure during preparations to the National Independence Day of November 11<sup>th</sup>.

Subject no.	Energy expenditure kcal/min	Heart rate		
		Minimum	Maximum	Mean
1	3.013	80	180	104
2	3.105	52	142	80
3	3.122	59	121	84
4	3.454	60	144	86
5	3.665	53	132	84
6	3.689	69	145	87
7	3.830	55	177	118
8	3.852	57	161	89
9	3.872	45	225	91
10	3.938	47	161	118
11	4.036	83	163	111
12	4.676	69	148	94
13	5.191	68	159	96
14	5.359	63	160	97
15	5.510	65	158	98
16	5.848	68	159	102
17	5.924	70	208	102
18	6.647	81	161	105
19	6.551	64	222	102
20	6.928	83	173	107
21	7.465	79	227	111
22	8.711	86	176	114
<b>Mean:</b>	<b>4.93±1.59</b>	<b>66.1±12.1</b>	<b>168.2±29.1</b>	<b>99.1±11.4</b>

The energy expenditure during preparations to the National Independence Day of November 11<sup>th</sup> is presented in Table 1.

Mean energy expenditure in subjects was 4.93±1.59 kcal/min. Depending on the ceremonial activity being trained, the energy expenditure ranged from 3.013 kcal to 8.711 kcal/min. According to Christensen's classification of workload, the measured mean energy expenditure associated with the activities performed by the soldiers of the Representative Battalion of the Polish Army as part of preparations to the celebration of the National Independence Day of November 11<sup>th</sup> allows the workload to be classified as light [2]. Also indicative of light workload is the mean systolic heart rate of 99.1±11.4 bpm [3]. During the three-day concentration, the training sessions were held for 8 hours/day, with the effective drill training time of 7 hours. Mean energy expenditure of soldiers

during a 7-hour training was  $2068.9 \pm 671.2$  kcal, with actual values ranging from 1265.5 to 3658.6 kcal depending on the activity performed. Although according to the classification of workload depending on the energy expenditure per labour shift, can be classified as heavy on the basis of mean energy expenditure [4], the actual values of energy expenditure were diverse and depended on the type of ceremonial activities performed. As shown by the obtained results, work performed by some soldiers was classified as light, while energy expenditure of others was typical for heavy, or even very heavy workloads. The results of earlier studies of the

energy burden of soldiers of the Representative Company of the Polish Army suggested that the daily energy expenditure was 4,648 kcal, which classified the work performed by the soldiers as very heavy [5].

## Conclusion

The energy burden of the soldiers of the Representative Battalion of the Polish Army during the drill training held as part of preparation for the celebration of the National Independence Day of November 11<sup>th</sup> was varied and allowed the workload to be classified as light to very heavy.

## References:

1. [www.brepr.wp.mil.pl](http://www.brepr.wp.mil.pl)
2. Christensen C.G., Frey H.M., Foenstelinen E. A.: A critical evaluation of energy expenditure estimates based on individual O<sub>2</sub> consumption/heart rate curves and average daily heart rate. *Am. J. Clin. Nutr.* 1983, 37, 468-472
3. Klonowicz S.: Wybrane zagadnienia fizjologii pracy w: J. Rosner *Ergonomia. Zagadnienia przystosowania pracy do człowieka*. Warszawa, 1974, 139.
4. Bugajska J.: Ocena obciążenia pracą fizyczną dynamiczną na stanowisku pracy. Pakiet edukacyjny „Nauka o pracy – bezpieczeństwo, higiena, ergonomia”. CIOP, [www.cop.pl](http://www.cop.pl)
5. Kłós A., Szymański A.: Ocena wydatku energetycznego młodych mężczyzn pełniących służbę wojskową w Kompanii Reprezentacyjnej WP, *Lekarz Wojskowy* 1996, 9-10, 522-525

