

DESCRIPTIVE AND COMPARATIVE ANALYSIS OF THE ADMISSION TESTS FOR THE MOUNTAIN RESCUE CORPS OF THE GUARDIA CIVIL (SPAIN)

Carlos Castellar¹, Antonio Cardona², Alejandro Moreno-Azze¹

¹Faculty of Health and Sports Sciences, University of Zaragoza, 22001 Huesca, Spain

²ENFYRED Research Group, Faculty of Health and Sports Sciences, University of Zaragoza, 22001 Huesca, Spain

SUMMARY

The Mountain Rescue and Intervention Group (GREIM) of the Spanish Civil Guard plays a critical role in ensuring safety and conducting rescues in mountainous terrains. Established to address the specific demands of rescues in inaccessible and high-altitude areas, GREIM members require exceptional physical and technical preparation. This study provides a descriptive and comparative analysis of the GREIM admission tests, evaluating their rigor and comparing them to similar tests in other specialized rescue units. The primary aim of this research is to analyze the results of the GREIM admission tests and compare their type and level of demands with those of other rescue bodies and similar units. Data collection took place during the GREIM admission tests in March 2023. The GREIM tests are designed to select candidates with the necessary physical and technical skills to operate in extreme conditions. Compared to other specialized forces such as firemen and military units, the GREIM tests are more exhaustive, incorporating unique elements like climbing and navigation in difficult terrains. This ensures that GREIM members are prepared for the high physical demands of mountain rescues, where both physical and psychological resilience are critical. Overall, this study highlights the high level of physical and technical demand of the GREIM admission tests. The comprehensive preparation required for these tests underscores their alignment with the requirements of other specialized mountain rescue units internationally, ensuring the selection of highly capable and prepared candidates for mountain rescue operations. This comparative analysis reveals a convergence in the standards of these demanding assessments, adapted to the specific operational environments of each rescue unit.

Key words: Tests, Mountain rescue, Comparative analysis

Corresponding author

Carlos Castellar
castella@unizar.es

INTRODUCTION

The Mountain Rescue and Intervention Group (GREIM) of the Spanish Guardia Civil is a specialized unit that plays a crucial role in safety and rescue in mountainous environments. Founded to respond to the specific demands of rescues in inaccessible and high mountain terrains, the GREIM requires its members to have exceptional physical and technical conditioning.

Since its creation in 1967, the Mountain Rescue and Intervention Groups (GREIM) of the Spanish Guardia Civil have been an essential pillar in safety and assistance in the mountainous areas of the country. Conceived to face unique challenges of high mountain rescues, these specialised teams emerged in response to increased sports and recreational activities in mountain areas, which raised the need for rapid and effective interventions in emergency situations. The Guardia Civil, with its long tradition of service and protection, recognized the need to form units with advanced technical skills and exceptional physical preparation to operate in extreme conditions.

Over more than five decades, GREIM has evolved significantly in its structure and capabilities. Initially composed of a small number of civil guards trained in basic rescue techniques, these groups have gradually incorporated advanced technology, modern intervention methods and continuous training including climbing, skiing, and high mountain first aid. Additionally, collaboration with other rescue corps and participation in international training has allowed the GREIM to remain at the forefront of rescue techniques and emergency management in difficult and dangerous terrain.

GREIM interventions cover a wide range of situations, from rescues of climbers trapped in inaccessible areas to search operations for missing persons and assistance in mountain accidents. Each rescue is a complex operation that requires meticulous planning, in-depth knowledge of the terrain and precise execution. GREIM members must not only face harsh weather and challenging geography, but also perform under the pressure of saving lives in often extreme situations. Their ability to respond quickly and efficiently has saved countless lives and solidified their reputation as a vital resource in the safety of the Spanish mountains.

The commitment and dedication of the GREIM are not limited only to the mountains of Spain. Along the years, these groups have participated in international missions, bringing their experience and knowledge to other countries in situations of natural disaster and complex rescue operations. Their work has been recognized both nationally and internationally, standing out not only for their operational effectiveness but also for their humanity and professionalism. Thus, the GREIM of the Guardia Civil have become a symbol of excellence in mountain rescue, a testament to the courage and determination of its members who risk their lives daily to save others.

The physical admission tests for the GREIM are designed to select candidates who possess the necessary skills and endurance to operate under extreme conditions. This article explores the demanding admission tests for the GREIM, comparing them with the physical requirements of other specialized corps, and analyzing the preparation necessary to pass these evaluations.

These include a series of assessments designed to measure aerobic capacity, strength, endurance, and technical skills under adverse conditions. These tests are fundamental to ensuring that the GREIM members can conduct rescue operations in mountainous and high-altitude environments, where physical capacity is crucial for mission success and survival. The tests include long-distance running, climbing tests, and strength and endurance exercises, all designed to evaluate performance under high physical demands.

Comparatively, the GREIM physical tests present a higher level of difficulty than other security forces and specialized units such as firemen and military personnel. For example, while firemen must pass endurance and strength tests like the Cooper Test and weightlifting¹, the GREIM tests include additional elements such as climbing and navigating difficult terrains, which require advanced technical skills. Similarly, compared to the physical tests of military forces, which, although rigorous, do not always include the specific challenges of high mountains², the GREIM tests are more exhaustive in terms of the specific capabilities they evaluate.

Preparation for these tests involves not only intensive physical training but also psychological adaptation to extreme conditions. The ability to maintain concentration and decision-making under stress is crucial for GREIM members, given the nature of their operations in unpredictable and dangerous terrains. Recent studies have shown that candidates who pass the GREIM admission tests report a higher level of physical and mental preparation compared to their counterparts in other security forces³.

Therefore, the aim of this research is to conduct a descriptive analysis of the results of the GREIM admission tests and compare the type and level of demand of the tests with other similar rescue corps and units.

METHODS

Data collection occurred during the GREIM admission tests carried out in March 2023. The analyzed tests were as follows:

1. **Mountain Trail Test:** This test involved a 12.1 km trail with a positive elevation gain of 977 meters and a negative elevation loss of 1056 meters, performed with an 8-kilogram backpack. This test is eliminatory and selective. Conducted on a mid-mountain course, candidates must carry a backpack weighing between 7 and 10 kilograms, excluding the weight of water or liquids for hydration. The trail follows marked paths and tracks, with a maximum positive elevation not exceeding 1500 meters. The terrain may include:
 - a. A boulder area
 - b. An ascending grass slope
 - c. A descending grass slope
 - d. A climb over a rocky step
 - e. A descent over a rocky step

2. **Swimming:** This involves a sequence of water displacement and apnea. The candidate must swim 50 meters freestyle, with one or more apnea immersions. Starting from a standing position on the pool edge platform, the instructor will give the start command ("ready... go!"). During swimming, the candidate must dive to retrieve a ring from the pool bottom and place it on the pool edge. The maximum time allowed is 48 seconds for men and 52 seconds for women. Failing to complete within this time results in disqualification. Basic equipment: swimsuit and optional goggles.
3. **Climbing:** This eliminatory and selective test involves completing four climbing routes with French grades: 5+, 6a, 6b, and 6c. To achieve a minimum pass, the 5+ route must be completed with a top rope. Candidates who pass this level may attempt other routes, which must be completed within the time set by the evaluating committee. The 6a, 6b, and 6c routes must be completed lead climbing. Climbing shoes may be used, and a climbing harness and certified helmet are mandatory.
4. **Fixed Semi-static Rope Progression:** Conducted on a 30-meter endless rope circuit, using at least 60 meters of rope arranged in a right-angled triangle vertically:
 - a. At the first vertex (V1), about 1 meter above ground, the rope passes through a descender to regulate movement through a pulley at the second vertex (V2), about 5 meters above ground. The rope reaches the third vertex (V3) forming a right angle with the ground.
 - b. The rope is marked at the beginning and end of the 30-meter circuit, with a minimum 5-meter margin at the start and 15 meters at the end. A knot at the end prevents accidental escape from the V1 descender.
 - c. The climbing technique will use the Ded system, employing a chest ascender and a hand ascender with a foot loop.
5. **Mountain Skiing:** Candidates, carrying a backpack weighing between seven and ten kilograms, will complete a mountain ski course with a maximum positive elevation of 1500 meters and a total length of twelve kilometers. The course includes transitions for crampons and ice axe use, ski descent, and ski ascent, mainly on untreated snow.
6. **Vertical Jump (Sargent Test):** This test involves a vertical jump from a standing position, measuring the difference in centimeters between the reach with an extended arm and the jump height. The minimum height is 49 cm for men and 43 cm for women.
7. **Push-Ups:** The candidate, positioned leaning forward, places hands comfortably with arms perpendicular to the ground. Continuous push-ups are performed, counting as complete when the chin touches the ground and returns to the starting position, maintaining shoulder, back, and leg alignment. Minimum requirements: 50 push-ups for men, 38 for women. A padded surface of up to six centimeters may be used for chin contact.

8. **Pull-Ups:** From a pure hanging position with palms forward, the candidate performs continuous arm flexions until the chin overcomes the bar height without leg thrust, then returns to hanging. Minimum requirements: 15 pull-ups for men, 12 for women. No resting is allowed.
9. **Underground Passage:** The candidate must navigate a narrow underground system with low or no light to test for claustrophobia adaptation. The system has different entry and exit points. The path will be verified by guides under the same conditions, and candidates must complete the proposed course within the time set by the evaluating committee. The reference time will be the arithmetic mean of the guides' times.

RESULTS

The sample consisted of 35 Guardia Civil officers (31 men and 4 women). Data extracted and summarized in this section pertain to the 20 candidates who passed all the tests. The weight and height profile of the entire sample is summarized in Table 1:

Table 1. Sample characteristics

	Weight (k)	Height (cm)
Average	71,1	176,1
Standard Deviation	7,7	6,7

In the mountain trail test, covering a 12.1 km course with a 977-meters positive elevation gain, the average time for qualified candidates was 2 hours, 9 minutes, and 42 seconds (with a standard deviation of 15 minutes and 37 seconds).

For the swimming test, the average time among those admitted was 36 ± 3.2 seconds. In the climbing test, 25 percent of the admitted candidates (5 officers) successfully completed a V+ climbing route. Fifty-five percent (11 officers) successfully completed a 6A level route. Finally, 20 percent (4 officers) successfully completed a 6B level route.

The results of the fixed semi-static rope progression test showed an average time of 1 minute and 42 seconds, with a standard deviation of 17 seconds.

In the mountain skiing test, covering a 4.5 km course with a 734-meter positive elevation gain, the average completion time for the admitted candidates was 1 hour and 11 minutes (with a standard deviation of 9 minutes and 26 seconds).

Finally, the underground passage, vertical jump, push-ups, and pull-ups tests were classified as either pass or fail. The performance criteria for the last three tests were as follows:

1. **Vertical jump (Sargent test):** 49 centimeters for men and 43 centimeters for women.
2. **Push-ups:** 50 repetitions for men and 38 repetitions for women.
3. **Pull-ups:** 15 repetitions for men and 12 repetitions for women.

DISCUSSION AND CONCLUSIONS

The descriptive analysis of the admission tests for the Mountain Rescue and Intervention Group (GREIM) of the Spanish Civil Guard reveals a series of physical and technical demands that reflect the high level of preparation required to join this specialized unit. Comparing these results with other similar rescue bodies and units allows contextualizing the rigor and specificity of these tests.

The results obtained in the GREIM entry tests show an average completion time of 2 hours, 9 minutes, and 42 seconds in the mountain trail test, indicating high physical endurance and recovery capacity under load conditions (8 kg backpack) and significant elevation changes (977 meters positive and 1056 meters negative). This test, compared to other mountain rescue units, shows a similar level of demand to the entry tests for the Mountain Rescue Service in the United States, where candidates must complete long-distance courses under extreme conditions⁴.

Regarding the swimming test, GREIM candidates completed a 50-meter freestyle course with apnea immersions, with an average time of 36 ± 3.2 seconds. This type of test, which combines aerobic and anaerobic endurance, is comparable to the swimming tests of the Coast Guard search and rescue teams, which also require similar completion times and combine diving and swimming techniques⁵.

The climbing test, with requirements to complete routes up to 6b in the French grading system, reflects the need for advanced technical skills and excellent physical condition. Similarly, the entry tests for the Alpine Rescue Service in Switzerland also require technical climbing skills, although in some cases they focus more on the ability to perform rescues in avalanche conditions and on glacial terrains, showing a variation in the type of specific skills required⁶.

Regarding the fixed semi-static rope progression test, with average times of 1 minute and 42 seconds, it highlights the importance of efficiency in rope techniques and equipment handling, crucial aspects in vertical and depth rescues. This type of test resembles the evaluations carried out by the Speleological Rescue team in Italy, where skills in rope techniques in underground and highly technical environments are assessed⁷.

In addressing the mountain skiing test, which includes a 4.5 km course with a positive elevation gain of 734 meters, and transitions between different modalities (skis, crampons, ice axe), the admitted candidates demonstrate comprehensive preparation for severe winter conditions. This type of test is analogous to that of the rescue teams in alpine areas in Austria, where a combination of skiing and mountaineering skills is required under adverse conditions⁸.

The vertical jump, push-ups, and pull-ups tests, with requirements of 49 cm, 50 repetitions, and 15 repetitions respectively, highlight the importance of explosive strength and muscular endurance. These tests have equivalents in the physical evaluations of the U.S. Air Force disaster response teams, where the ability to perform physically demanding tasks sustainably is also emphasized⁹.

Therefore, the GREIM entry tests for the Civil Guard not only reflect high physical and technical demands but also align with the requirements of other mountain rescue bodies and specialized intervention units internationally. This comparison underscores the comprehensive preparation required for rescue operations in extreme environments, where the combination of specific skills and physical endurance is crucial for mission success.

Comparing these tests with those of other similar bodies, such as alpine rescue services and disaster response teams, reveals a convergence in the standards of demand, although adapted to the particularities of each operational environment. These findings are consistent with previous studies indicating that advanced technical skills and endurance capacity are critical factors in the selection of personnel for rescue operations in challenging terrains¹⁰.

To sum up, the physical entry tests for GREIM are a model of rigorous evaluation that ensures the selection of highly skilled and prepared candidates to face the unique challenges of mountain rescues. The comparison with other specialized bodies highlights the specificity and difficulty of these tests, emphasizing the need for thorough physical and psychological preparation for their successful completion¹¹.

REFERENCES

1. Silva-Piñeiro, R., Vilas-Casal, D., Carballo-López, J., Su, H., Castro-Bermúdez, A., Alonso-Dávila, P., & Bas-Fernández, A. (2022). Procesos selectivos de bomberos: revisión de las convocatorias con pruebas físicas en España. *IPSA Scientia, revista científica multidisciplinaria*, 7(4), 24-37.
2. Garrido, J. C. N., & de Tierra, C. D. E. (2016). Y yo también pasé las pruebas SLP. *Revista general de marina*, 270(4), 469-477.
3. García-Guirao, N. M. (2022). El estrés laboral (burnout) como riesgo psicosocial en la Guardia Civil: Un estudio exploratorio. Proyecto de investigación.
4. Johnson, L. (2004). An introduction to mountain search and rescue. *Emergency Medicine Clinics*, 22(2), 511-524. <https://doi.org/10.1016/j.emc.2004.01.010>
5. Piñeiro, R. S., López, J. C., Dávila, P. A., Bermúdez, A. C., Fernández, A. B., & Casal, D. V. (2023). Pruebas físicas de acceso a los cuerpos policiales en España: análisis de sus características generales y de asesoramiento. *Revista Española de Educación Física y Deportes*, 437(2), 26-36.
6. Festi, L., Brugger, H., & Zafren, K. (2022). *Medicina de urgencias en montaña*. Grupo Asís Biomedica SL.
7. Sauro, F., De Waele, J., Payler, S. J., Vattano, M., Sauro, F. M., Turchi, L., & Bessone, L. (2021). Speleology as an analogue to space exploration: The ESA CAVES training programme. *Acta Astronautica*, 184, 150-166. <https://doi.org/10.1016/j.actaastro.2021.04.003>
8. Elsensohn, F., Niederklapfer, T., Ellerton, J., Swangard, M., Brugger, H., & Paal, P. (2009). Current status of medical training in mountain rescue in

- America and Europe. *High Altitude Medicine & Biology*, 10(2), 195-200.
<https://doi.org/10.1089/ham.2008.1074>
9. Ritland, B. M., Naylor, J. A., Bessey, A. F., McKeon, A. B., Proctor, S. P., Capaldi, V. F. & Sowden, W. J. (2021). Transitioning from daytime to nighttime operations in military training has a temporary negative impact on dynamic balance and jump performance in US Army Rangers. *Journal of Science and Medicine in Sport*, 24(9), 919-924. <https://doi.org/10.1016/j.jsams.2021.02.013>
 10. Callender, N., Ellerton, J., & Macdonald, J. H. (2012). Physiological demands of mountain rescue work. *Emergency Medicine Journal*, 29(9), 753-757. <https://doi.org/10.1136/emered-2011-200485>
 11. Conolly, M., Elder, C., & Dawes, J. (2015). Needs analysis for mountain search and rescue. *Strength & Conditioning Journal*, 37(4), 35-42. doi: [10.1519/SSC.0000000000000124](https://doi.org/10.1519/SSC.0000000000000124)

Received on 24.06.2024.

Accepted on 05.07.2024.