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Features of the classification of acrobatic exercises of group B – "balancing" and their varieties in artistic swimming

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Purpose: *to classify acrobatic exercises of group B according to their level of complexity.*

Material & Methods: *theoretical analysis and synthesis of scientific and methodological literature data, analysis of competition results, pedagogical observations, surveys, questionnaires, video analysis of competitive programs of the finalists of the World and European Championships 2008–2019, system analysis, methods of mathematical statistics.*

Results: *the author's system of classification of acrobatic exercises made it possible to sort in detail and develop a method for determining and calculating the complexity of 130 basic acrobatic exercises of group B.*

Conclusions: *the data obtained became the basis for the development of a single table of the technical value of acrobatic exercises of group B in artistic swimming. Preliminary testing of this system and its discussion at international seminars for specialists, coaches and judges of various qualifications in artistic swimming made it possible to introduce a number of refinements, additions and to improve the development of a system for classifying acrobatic exercises of group B and assessing their complexity.*

Keywords: *acrobatic exercises, artistic swimming, balancing, classification, technical value.*

Introduction

In recent years, judges' special attention in artistic swimming has been paid not only to curly ties, but also to spectacular acrobatic exercises, which occupy 20–25% of the entire performance [9] and very well reflect the level of skill of athletes [2]. Based on statistical data, the greatest surge in the creation of new, previously unknown acrobatic exercises in artistic swimming began in 2013 at the World Synchronized Swimming Championships in Barcelona (Spain), where 17 strongest teams of the world took part.

The greatest variety of acrobatic exercises was shown there compared to 2008–2012. First of all, the exercises of group B were demonstrated – "balancing", where athletes performed acrobatic exercises "without breaking away from the support". The diagram below shows the results of a video analysis of the performances of the finalists of the World Synchronized Swimming Championships in 2013. Where 38% of all the acrobatic exercises demonstrated were group A exercises – "in the air". Only 4% of combined acrobatic exercises were demonstrated and group P acrobatic exercises – "platforms" – 6%. The most performed were exercises of group B – "balancing", with a result of 49%.

On the diagram you can see the variety of acrobatic exercises of both group A and group B. With 49% of the group B belong to "balancing", 19% took ordinary "Lifts", where the entire team of 7 athletes is lifted from the water performer. 13% belong to "paired elevators" – acrobatic exercises, which are the same as "Elevators", but in "paired elevators" 8 athletes are divided into two small groups, each of which has its own performer. 2% – performing the simplest acrobatic exercise, where the performer sits on the shoulders of the middle "support" athlete was performed on. The same result belongs to

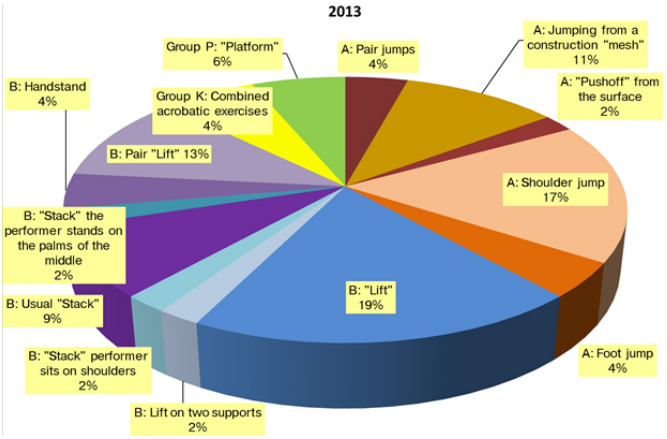

Fig. 1. Percentage of acrobatic exercises performed at the World Synchronized Swimming Championships in 2013

the acrobatic right, where the performer balanced on two average "supporting" athletes. "Stack", where the performer stands on the palms of the average "support" athlete, also amounted to 2%. The usual "Stack" was performed 9% and 4% of the execution was a heavy acrobatic exercise, where the performer demonstrates a stand on her hands, balancing on the palms of the middle "supporting" athlete.

Group A "jumping" – a group where the performer performs acrobatic exercises in the air, did not show such a variety in comparison with group B. In total, the performer jumped from the shoulders of the average "supporting" athlete – 17%. The next most demonstrated acrobatic exercise is the performer's jump from the lattice design – 11%. The least performed acrobatic exercises: "pushing" the performer off the surface – 2% and a jump from the legs of the average "supporting" athlete

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showed only 4%.

Unfortunately, many teams did not receive well-deserved high marks, primarily because in the FINA rules [8; 10] at that time there was no clear classification of acrobatic exercises and criteria for assessing their complexity. In this regard, the need arose for a detailed study of the varieties of acrobatic exercises in artistic swimming, and it was decided to start with group B, which is very close to sports acrobatics, which later made it possible to navigate and rely on the classification and technical values of acrobatic elements in this sport and take them as the basis for developing your own system.

Purpose of the study: to classify acrobatic exercises of group B according to their level of complexity.

Material and Methods of the research

Research methods – theoretical analysis and synthesis of scientific and methodological literature data, analysis of competition results, pedagogical observations, surveys, questionnaires, video analysis of competitive programs of the finalists of the World and European Championships 2008–2019, system analysis, methods of mathematical statistics.

Results of the research

In a previous publication [5], two varieties of acrobatic exercises of group B were identified. Based on the principles of identifying structural groups in spectacular sports [4; 6; 7], the exercises of this group were divided into two subgroups: Lifts – from the English. lift – lift and Stak – the term according to CODE OF POINTS [6] and means acrobatic exercises, where the athlete "performer" is located on the "middle" (or supporting) athlete, which under water contains six athletes.

It is believed that the Lifts group is the easiest, because it does not require special coordination skills and special ability to work together from female athletes due to the fact that this subgroup consists only of a "performer" and sportswomen who lift it.

Between themselves, these acrobatic exercises differ only in the level of flexibility that the "performer" demonstrates, provided that the same number of "athlete-lifters" are the same. Very rarely, athletes perform an acrobatic exercise, when the "athlete-lifts" simultaneously move parallel to each other, due to which the position of the "performer" changes. This type is called an acrobatic exercise on a "moving" structure (Figure 2).

The next and most is the Stak group. The most important factor affecting the complexity and at the same time the technical value of the acrobatic exercise is the area of the support on which the athlete balances.

The area of support provided by the average (support) athlete is: large, medium, small and very small. A large area of support includes parts of the body of the average athlete, such as the stomach, back, and hips. Shoulders and shoulder blades were assigned to the middle area of the support, feet and head to a small area of the support. Palms (arms) were assigned to a very small area of the support (extreme level).

It is important to note that the complexity depends not only on

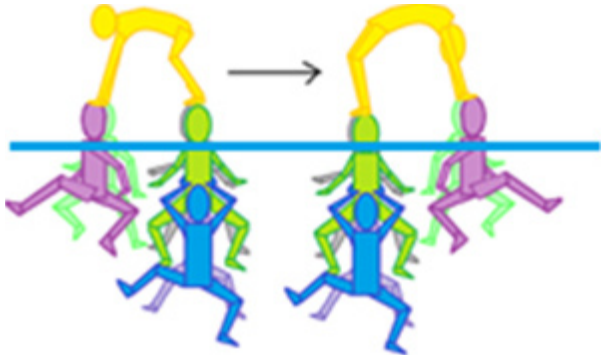

Fig. 2. An example of a "movable" design, where the "athlete-lifts" simultaneously move, thereby changing the position of the "performer"

the area of the support provided by the average athlete, but also on what part of the body the "performer" rests or stands on this plane. That is, if a performer sits with her hips (large area of support) on a very small area of support, then this cannot be evaluated equally with a stable performer (very small area of support), which rests only on the hands of the average athlete (very small area of support). Given these factors, numerical values were assigned to each type of plane (Table 1).

Table 1
Digital values the support area

Plane size	Value
Big	0,1
Average	0,3
Small	0,5
Very small	0,6

The next step was to combine the existing types of acrobatic exercises of group B of the Stak subgroup into a single table, which forms the evaluation criterion "Support area" or "Connection type cost".

To determine the value of each "combination", the value of the area of the support provided by the average athlete is entered in the first column, and in the other column the area of the support on which the "performer" balances. In the third column is the "average" derived from the previous two. Also added another column for "applications and visible". And the last column is the "total cost", which is written in the number derived by adding all the previous numbers.

Subtraction for those exercises where:

- the average athlete holds the performer with both hands (–0.3)
- pushing athletes are not under water, holding the average athlete, but on the surface of the water and provide additional support to the upper athlete (–0.2)
- body center of mass is very close to the support.

Applications:

- acrobatic exercise is performed by the performer, leaning on the head of the average athlete (0.2)
- for the "foot / foot" connection, where there is not a single grab between the average athlete and the performer (0.2)

Table 2

Cost of the type of "connection" of the performer and the average (supporting) athletes

Type	Support area of the average athlete	Support area of the performer	Average	Applications and subtraction	Total cost
Hips on shoulders	0,3	0,1	0,2	–0,1	0,1
Feet on the shoulders	0,5	0,3	0,4	–0,3	0,1
Shoulders on legs (performer is in upside down position)	0,5	0,3	0,4		0,4
Shoulder on the hips	0,3	0,3	0,3	+0,2	0,5
A brush on the head and additional support with one hand for the average athlete	0,5	0,6	0,55	–0,1 +0,2	0,65
Foot / Foot	0,5	0,5	0,5	+0,2	0,7
Brushes / Brushes	0,6	0,6	0,6	+0,4	1

• for compounds where the performer and the average athlete do not see each other – "blind connections" (+0,2)
• to connect the brush / brush 0.4 because the performer is upside down, leaning on a very small support (brushes), which is difficult to balance, given the efforts that the average athlete must make to keep the weight of the performer (which is in an upright position and presses on the average athlete with all the weight) on his hands.

The next factor that affects the technical value of acrobatic exercises of group B of the Stak subgroup is the position that the performer demonstrates.

Based on the assessment of this criterion was taken developed by prof. Medvedeva [3; 7] a system for determining technical value in rhythmic gymnastics. Leg movements were distributed in the following directions: forward, sideways and backward. And depending on what degree the foot / foot rise or fall from the vertical line, the athletes will get 0,1. For example: an assessment starts at 90° and has a value of 0,1 (forward and to the side), 135° has a value of 0,2, and a full twine of 180° is estimated at 0,3 points. With the exception of the backward direction, where the cost is a little more, because physiologically making back deflection is more difficult than raising your leg forward [1].

Among the criteria for evaluating a position, certain "bonuses" were derived:

- If balancing is performed standing on one leg 0,1
- Grip with both hands legs 0,1
- Position performed upside down +0.2

An equally important factor of complexity is the turn of the whole structure, when athletes who are under water push the average athlete and she, together with the performer, rotates around herself. This factor affects the content of the performer of the position and requires special skills from her. Therefore, athletes who demonstrate such acrobatic exercises, as a rule, receive a great rating.

Table 3

Technical value of the turnover of the entire structure in group B

Rotation degree	Technical value
180°	0,1
360°	0,2
540°	0,3
720°	0,4

Conclusions / Discussion

The author's system of classification of acrobatic exercises made it possible to sort and develop in detail the methodology for determining and calculating the complexity of 130 basic acrobatic exercises of group B.

The data obtained became the basis for the development of a single table of technical value of group B acrobatic exercises in artistic swimming.

Previous testing of this system and their discussion at international seminars of specialists, coaches and judges of various qualifications in artistic swimming made it possible to introduce a number of refinements, additions and improve the development of a system for classifying acrobatic exercises of group B and assessing their complexity.

In the future, it is planned to develop a classification system for acrobatic exercises of group A, in which acrobatic exercises are performed by a "performer" in the air.

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