SPECIFIC ANALYSIS OF SKI-JUMPING NEW YEARS TOURNAMENT OF 2008/09

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Original scientific paper

Abstract
The aim of this article was relation determination of final score position on Ski-jump Tournament 2008/09 with particular competition phases. As methodological exploration, research was conducted with intention of determination of competition phases of individual ski-jumping location. Data of 67 jumpers that at least once (of 4 possible situations) take one of 50 best places were taken as official results. Correlation analysis were applied, and average correlation of individual matches also, for total sample as well as for sub-samples of 30, 20, 15 and 10 jumpers that were best positioned at the end of Tournament. Results have shown a set of information existence that is best to explain as: a) tactical introduction, b) real positioning, c) technical test, and d) value confirmation. Originality of research is expressed in the defining total logic of particular jumping location, and limitations of research could be defined in the part that correspond with extraordinary situations like whether conditions, bad mistakes of best jumpers and eventually connected with total position of some jumpers in World cup. With those situations respect research for sure remains highly methodologically positioned.

Key words*: skiing, ski-jump, correlations, positions*

Introduction

Skiing is a winter sport. It can be grouped into two general categories: Nordic skiing and Alpine skiing (Bilić, Mijanović & Božić, 2007). Nordic skiing includes ski jumping on smaller ramps (normal hill 90 m, large hill 120 m etc) but also on ski flying (over 200 m).

This extremely attractive sport for audience has its characteristics and from competitors demands extreme explosiveness of the lower extremities, balance, preferring challenges and courage (Gamma, 1982; Matković, Ferenčak & Žvan, 1996; Bonacin, Bilić & Bonacin, 2008; Bilić, Bonacin & Božić, 2008). Even it seems simple according to its structure of movement, it is actually very complex sports because it is performing mostly without any support in other words in the air (Ashburner, 2003). In the result of each jump distance achieved evaluates but also a style which decides a group of judges.

From biomechanical point of view, this sport discipline is an example of ballistic shot, since it is not possible to achieve large distance or score high without good starting speed which is maximal in the moment of jumper's take off from the ramp at the point where "the flight" begins (Virmavirta, Kivekas & Komi, 2001).

In flight phase, competitor is trying to keep aerodynamics so he could use starting élan and in adequate position of skis and his body to "sail" as far as possible using air resistance with landing that guarantees his safety (Schmolzer & Muller, 2002; Burns, 2009; Muller, 2009). Competitions in ski jumping are conducted in a way that jumpers participate in many competitions and collect their points for final placing at the end of the season, so called World cup.

There are exceptions regarding Olympic Games and World Cups where the results evaluate same as in team competitions where different Countries participate. One of such competitions for individual jumpers is Four ramps tour (or New Year's tour) that is held in four different locations (Oberstdorf – Germany, Garmisch-Partenkirchen – Germany, Innsbruck – Austria and Bischofshofen – Austria) around New Years (29.12. – 06.01.).

Even though these results are added to points for the World Cup, this tour is scored in a special way since competitors are especially motivated for such tournament. A lot of audience is present and attracts great media attention.

Problem, subject and goal

Although different analysis regarding skiing is being conducted, even in ski jumping, it is always interesting to search for achieved results and data correlations especially when it comes to data from certain competitions, in other words situational parameters. For that reason in this work in simple way we analyzed data from New Year's tour 2008/09. The subjects of the research were ski jumpers, and the aim of the work is determining correlations of individual results for each jumping ramp with final result of the entire Cup.

Methods

For requirements of this work we analyzed officially achieved results (*www.fis-ski.com, 2009*) the best positioned 50 best jumpers on each of 4 ramps. Totally we analyzed 67 ski jumpers that were at least once placed among the best positioned 50 jumpers on one of the locations.

Data of each jump (distance in the first and second series and total scoring) were brought into correlation with final scores in entire Tournament (Bonacin, 2004). In order to determine how much these results correspond with final scoring, we calculated correlations with all competitors that were among the best positioned 50 jumpers, then the ones who were among the best positioned 30, then 20 best positioned, 15 and among the 10 best positioned jumpers. This is how we concluded how important stability of performance for final result is.

Results and discussion

According to the results in table 1, it is visible that all correlations are positive and large number of correlations is above their significance threshold. This relates to all of competitors (67), for the place among the best positioned 30 and 20 on the tournament, since not even one of correlations in this situation is not under significance threshold. In the set of the best positioned 15 jumpers on the tournament, only one correlation is under threshold of significance (distance of the second jump in Innsbruck). With 10 best positioned jumpers, however, even in Oberstdorf (distance in first jump) especially in Innsbruck, it is visible there are coefficients of lower significance so we conclude with the second jump there is correlation with final result that literally approaches to zero (0.14)

Table 1. Correlation of jump distance in the first (D1), second (D2) series and scoring on jumping ramp (BOD) with total scores on tournament for different number of respondents (N)

		1. Oberstdorf			2. Garmisch			3. Innsbruck			4. Bischofshofen		
N	**GV**	**D1**	**D2**	**BOD**	**D1**	**D2**	**BOD**	**D1**	**D2**	**BOD**	**D1**	**D2**	**BOD**
ALL	**0.304**	**0.80**	**0.79**	**0.83**	**0.86**	**0.85**	**0.90**	**0.85**	**0.75**	**0.80**	**0.82**	**0.81**	**0.85**
FIRST	**0.438**	**0.64**	**0.48**	**0.60**	**0.66**	**0.45**	**0.72**	**0.79**	**0.55**	**0.67**	**0.79**	**0.55**	**0.69**
FIRST	**0.473**	**0.70**	**0.74**	**0.83**	**0.75**	**0.62**	**0.78**	**0.77**	**0.53**	**0.70**	**0.80**	**0.79**	**0.84**
FIRST	**0.581**	**0.77**	**0.72**	**0.90**	**0.81**	**0.74**	**0.85**	**0.71**	0.51	**0.72**	**0.84**	**0.81**	**0.89**
FIRST	**0.673**	0.52	**0.83**	**0.89**	**0.76**	**0.68**	**0.80**	0.50	**0.14**	0.48	**0.82**	**0.77**	**0.88**

(GV = correlation limit values for acceptance of the hypotheses of significance at 99% of safety)

The situation in Oberstdof is easy to explain, since it is the first jump in the whole tournament, so for each jumper, especially the best ones who count on good positioning, that jump is extremely important, because if only that jump is bad they can completely loose the chance for the top positioning.

That situation has impact on the jump preparations and its performance and unlikely that the best will risk their first jump on tournament. They will jump seriously and will be engaged in that jump, but they will not give their maximum, since that is just enough for the next 7 jumps to achieve imagined maximum. Then we can conclude that jump is tactically and technically a good jump which confirms the fact that even 17 jumpers in the first jump had result over 127 m (11 of them over 130 m), and in second series only 10 of the jumpers (4 over 130 m), which means (considering conditions as well) that for the best jumpers the first series was equable.

And the distance differences among them are relatively small. Although somewhat weaker, tactics continues in second series when it is only necessary to achieve very good, but not excellent result, so without much risk, they could start the tournament well. This is also supported with the fact that the distance difference of both jumps between the first positioned and the 20th positioned in Oberstdof was around 20m and in points the difference was 45 points so it is easy to conclude that the difference in ranking was obtained at the expense of quality and not only for the jump distance.

Competition in Garmisch is extremely coherent to final achievement on the Tournament for all analyzed sub-samples. So we could say that Garmisch is credible forecast for the final achievement on the Tournament since the results are coherent. It is obvious that results are stabled, i.e. after two jumps competitors are ranked according their potential and skills. This competition is just a go through with not much variations and dynamics. This is not the case in Innsbruck.

In the best performers we determined variations that indicate there are at least two goals; to keep the high scoring and to aspire to the top. This is hard to accomplish since the distances are the shortest comparing all four locations, so it seems that Innsbruck is the real test of jumper's technical skills. The ones who are on the top, have already accomplished total scoring advance and they will attempt to keep it, but for that they also need two good jumps.

Competing on the last location in Bischofshofen will be less tactically oriented since according to Tournament, there is no more space for calculations. This ramp enables flying over 140 m, which gives the best a change to gain a lot of points. Here the distance difference is around 30 m and the point difference is almost 70 points. It is interesting that none of the jumpers couldn't enter among five best positioned from the previous competitions and almost all who were among 16 best positioned remained there.

Table 2. Average correlations on the ramps with total final results on the tournament for different number of respondents (N)

N	1.	2.	3.	4.
ALL (67)	0.81	0.87	0.80	0.83
FIRST 30	0.57	0.61	0.67	0.67
FIRST 20	0.76	0.71	0.67	0.81
FIRST 15	0.80	0.80	0.65	0.85
FIRST 10	0.75	0.75	0.37	0.83

Some "permutations" occurred but nothing to endanger the whole picture of entire Tournament. In table 2. the two average correlations of the first and second jump distance and scoring are visible and we noticed there is a certain set of variation with 30 best positioned and the rest is firmly distributed.

In this picture Innsbruck less fits, especially with 10 best positioned. It is also obvious that the effects of correlation selection did not play a special role on this Tournament, since we did not register correlation fall according to analysis of less competitors toward better once, which indicates that coincidence does not play a role in competition.

Conclusion

With sample of 67 competitors that at least once were among 50 best positioned on one of locations of New Year Tournament of 4 ramps 2008/09 correlation analysis of individual competing segments regarding finally scored results was conducted. Results indicated that each of 4 ramps (locations), besides climate and geographical characteristics, have its own competing characteristics in accordance with tournament phases. Oberstdorf presents ***tactical introduction*** in Tournament, Garmisch presents ***realistic positioning***, Innsbruck can be accepted as ***technical test*** and Bischofshofen as a ***final confirmation***. The jumpers that approached this tournament as such could have ensured the highest range and adequate positioning.

Preparations of ski jumpers for this tournament should be based in accordance with this acknowledgment in order to maximize individual score along with other necessary assumptions. It is unexpected that different planning would lead to maximum results, since objective indicators of this research proved that each location has undoubted competing position different for each location.

Although we can laconically say "the best are always the best", in other words the winner will be the jumper who wins in all four locations, it is unlikely that it will really happen like that if the jumpers don't accept the fact that each location presents constant but different essential character, that it actually has its "way of living" determined exactly by the final phase of total competing.

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Received: March 15, 2009.
Accepted: May 28. 2009.
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SPECIFIČNA ANALIZA SKIJAŠKIH SKOKOVA NOVOGODIŠNJE TURNEJE 2008/09

Sažetak

Cilj članka je bio utvrđivanje povezanosti finalnog bodovnog plasmana na Novogodišnjoj turneji sa pojedinim fazama natjecanja. Metodološki eksplorativno, istraživanje je provedeno s namjerom utvrđivanja natjecateljskih faznih svojstava pojedine skakaonice. Podaci 67 skakača koji su barem jednom od moguća 4 puta plasirani među 50 najboljih, preuzeti su kao službeni Fis podaci. Obrada je izvršena korelacijama podataka, a iskazane su i prosječne korelcije po skakaonici, sve za cijeli uzorak (67), ali i za subuzorke od 30, 20, 15 i 10 najbolje plasiranih na kraju Turneje. Rezultati su pokazali da postoji skup informacija koji se najbolje mogao opisati kao svojstva natjecanja u slijedu: a) taktički uvod, b) realno pozicioniranje, c) tehnički test i d) potvrda vrijednosti. Originalnost istraživanja je u definiranju ukupne logike za pojedine skakonice, a ograničenja zaključaka su moguća u onom dijelu koji se odnosi na izvanredne situacije poput vremenskih prilika, teških pogrešaka najboljih skakača i eventualno ukupnog plasmana u Svjetskom kupu. Uz uvažavanje ovih mogućnosti istraživanje sigurno ostaje visoko metodološki pozicionirano.

Ključne riječi*: skijanje, skokovi, korelacije, pozicije*