

Appendix I : Electronic Punching

1. Introduction

1.1 General Information

1.1.1 This Appendix presents a general overview of the use of electronic punching systems (EPS). In particular it addresses issues associated with the overall fairness of an event from a competitor viewpoint. It is not intended to be a guide to a particular system and cannot replace the more detailed information that exists for each specific system. EPS provides many benefits, but at the possible expense of problems with an event if things go wrong. It is particularly important that all officials are familiar with the equipment to be used and the procedures to be followed.

1.2 Approved Systems

1.2.1 Two systems are currently approved for use. These are:

- Emit
- SportIdent.

1.2.2 Other systems may be used if they are approved by the IOF, or on application to British Orienteering Rules Group.

1.3 To Use Or Not To Use

1.3.1 The organiser of an event should be responsible for deciding to use an electronic punching system. This should include consultation with the planner and controller. The use of any EPS at an event should be publicised in advance.

1.3.2 Experience of vandalism to date is that this is not as big an issue as was anticipated. Patrolling of controls is recommended in certain areas (e.g. city parks) to deter vandals. Options also exist to secure units more securely to objects such as fences using cable ties or even padlocks.

2. Organising and Planning Considerations

2.1 Registration

2.1.1. Competitors who own their own e-card should be allowed to use them. The organiser should also ensure that a stock of spare e-cards is available for hire on the day. Should the specific requirements of an event require a particular version of an e-card, for example because of touch free controls or a large number of controls on a particular course, then sufficient numbers of this version should be made available.

2.2 The Start

2.2.1 Special actions may be required at or before the start, such as the clearing of an e-card. Competitors' cards should be checked before the start to ensure that they are clear and functioning correctly. The latter is particularly important for e-cards that contain their own batteries, a competitor should be reassured that their e-card is functioning normally before starting. Careful thought is required about where to

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locate clear, check and download units to ensure that competitors do things in the correct order. Beware in particular any possibility of a competitor finding a clear unit between the finish and the download point.

- 2.2.2 The traditional timed start system may be used, with competitors starting at pre-allocated start times. In this case there is no need for them to punch at the start, although it is prudent to have a start unit available for those, who for perfectly valid reasons, are not able to start at their allocated time.
- 2.2.3 A punching start can allow competitors to start almost whenever they are ready and no pre-allocated start times are necessary. For events with low numbers of competitors this works well but with larger entries queues can form for the more popular courses. Competitors should not be started within a minute of each other and so it is not unusual for queues of over 15 minutes to form. This may not be popular in an exposed setting.
- 2.2.4 A hybrid system can be used, whereby competitors are issued a start time and (if they turn up for it) they are guaranteed that they can start at that time. However a punching start is still used and competitors can have the possibility of starting earlier or later than their allocated start time if there is a vacant slot on their course.
- 2.2.5 For events of Level 1 a timed start shall be used. This ensures that competitors start at a precise time and minimises the opportunity for them to manipulate their start time.

2.3 Control Sites

- 2.3.1 Because of the expense of the electronic equipment clubs may be wary of putting out the control units too far in advance. For lower key events in areas (such as high fells) where access is difficult, it has been found that the competitors are quite happy to punch an SI unit which has been simply placed on the ground next to the flag.
- 2.3.2 Some EPS systems have a low power consumption standby mode that can be activated into the full functioning mode by the insertion of a normal e-card. This 'activation' punch will still record the correct information on the e-card but the process will take considerably longer. Ideally EPS units should not be in this standby mode during a race since it is unfair for those competitors that have to spend time activating them. This problem can be addressed by activating all the units before the start of the race and programming them in a way that they are unlikely to revert to standby mode during the race.
- 2.3.3 The Planner has the advantage that competitors are no longer able to take controls out of order. This removes the need for manned controls. It also introduces the possibility of convoluted courses with many cross-overs. Care should be taken not to overuse this feature.
- 2.3.4 It may still be necessary to provide a second map to ensure that a course is obvious, rather than to prevent cheating. This can be done by providing two overprinted maps back to back, or by having two sets of master maps both at the start. Care should be taken to ensure that competitors understand what has been done.
- 2.3.5 It is likely that only one control unit will be available for most control sites. A control loading of over 500 competitors per hour per control unit is easily supported for

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normal events. Relay and score competitions may need a greater number of control units at certain controls, particularly early in the course.

- 2.3.6 Control sites should be marked with a standard control banner. Care should be taken when siting control units that stakes are inserted firmly into the ground, and that the control layout does not cause unnecessary inconvenience to competitors. For level 1 and 2 events stakes shall carry a backup punch to allow for loss of function of the unit.

2.4 The Finish

- 2.4.1 It is important to ensure that the finish is easily located. As a minimum the finish should consist of a punch unit and control flag, preferably with a prominent finish banner.
- 2.4.2 When a punching finish is used then at least two punch units, carefully synchronized, should be available at the finish (even if one is kept in reserve, eg at the base of the stake, until needed), to allow for equipment failure. The arrangement of the finish area needs careful consideration to allow fast-finishing competitors to stop and punch safely, and then move out of the way of other competitors.
- 2.4.3 Relay results are based on the order in which a team crosses the finishing line, and this element must not be compromised by EPS. A finish official should be present to adjudicate if necessary. Competitors should then be kept in order after the finish line and punch at a finish unit. This provides the correct finish order, and also gives times to a sufficient accuracy.
- 2.4.4 If possible the finish should be designed to allow competitors to pass the download point as soon as possible, this ensures that no competitor forgets to download and may then be considered to still be in the terrain.
- 2.4.5 One of the great benefits of EPS is the ability to provide results, including split times, almost immediately after a competitor has finished. This is a very popular feature with competitors, and should be done whenever possible. Competitors are normally given their own slip of paper, and sheets containing all results should be put on display at regular intervals. The provision of individual splits does not remove the need to display results on the day.
- 2.4.6 The organiser should work out in advance how missing competitors are to be identified towards the end of the competition, At an event where entries are entirely on the day, the missing competitors will be those who have entered but have not downloaded. At an event with pre-entries, it is necessary to identify those who actually started. Ideally, this can be done electronically by downloading the memory of the start or check units. It is important to make sure that those units have sufficient memory to store the expected number of competitors.

2.5 Equipment Failure

- 2.5.1 A major concern with the increased use of electronics and computers is the possibility of equipment failure. Event officials need to be aware of the various failures that can occur, and of what can be done. This information should be included in the specific user instructions built up for each system.

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- 2.5.2 The organising club should ensure that equipment failure does not significantly affect the fairness of the race. For events of level 1 and 2 a backup punching system shall be provided to allow competitors to prove that they have visited a control site at which the unit has failed.
- 2.5.3 Should it become known that a control unit has failed, or been vandalised, the planner should endeavour to replace the unit as soon as possible.

2.6 Punch Checking and Disqualification

- 2.6.1 Punch checking should be done as soon as possible after a competitor has finished. This provides the opportunity to investigate any problem with punching immediately. In cases where punches are missing through no fault of the competitor (such as failed or stolen control units) it is clear that the competitor should be reinstated.
- 2.6.2 Most competitors when confronted with the evidence that they have missed a control will accept that this is the case. Electronic punching offers the capability to show a competitor which control they went to in the case of a mistake, and it is useful to have an "all controls" map available for this.
- 2.6.3 Missing punches have proved to be the most controversial problem to address. In some cases it is possible for a competitor to visit a control and believe they have punched, but for there to be no record in the e-card. This may simply be a mistake (such as forgetting to punch at a road crossing or the last control) but more often the competitor believes they have punched correctly. The normal explanation is that they have not punched correctly, eg having punched too quickly for SportIdent, or not fully inserted the e-card for Emit. In these cases the competitor shall be disqualified, even if there is evidence (from spectators or electronically in the control box) that the competitor was at the control.
- 2.6.4 If a competitor loses, or breaks, their e-card during a race then they are unlikely to be able to demonstrate that they have completed the course correctly and should be disqualified. Even if the competitor has used pin punches to complete the course they will be unable to demonstrate that these controls were taken in the correct order.
- 2.6.5 The Organiser and Controller may consider disqualification to be harsh in cases where the competitor clearly believes they have visited the control, particularly at low key events or for junior competitors. For consistency it is preferable to enforce disqualification at all events. It shall certainly be adopted for Level 1 events. The underlying principle is that if competitors use the system in the approved manner then it works correctly. If competitors were allowed to get away with not punching properly, it could easily become the norm (and an organisational nightmare) to punch sloppily, or not punch at all at a spectator control such as the last control in a relay.

3. Results Adjustment

3.1 Introduction

- 3.1.1 Electronic punching offers what at first sight appears to be unlimited opportunities for adjusting results to overcome problems at an event. These include removing splits either side of a missing or miss-placed control or by redefining the control at

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which the race starts or finishes. It should be recognised though that making such adjustments can affect the outcome of the race in many ways and should not be viewed as a simple means of converting an unfair race into a fair race.

- 3.1.2 Whilst there are often political reasons why it is undesirable to void a race there will be circumstances, particularly in a major race, in which no other outcome is appropriate. Whilst removing splits may seem a fair solution, doing this can't turn an unfair race into a fair race and therefore this action should not be taken without giving serious consideration as to its fairness. An alternative to voiding is to let the results stand, this is the recommended approach if any problem with a course is not believed to have significantly affected the outcome of the race.

3.2 Voiding courses and adjusting results

- 3.2.1 If a complaint has been made about the fairness of a course then a decision will have to be made as to whether to let the race results stand, adjust the results or void the course. Which action to take should depend on the seriousness of the problem that prompted the complaint, the effect that the problem would have on the race and the nature of the event. The following guidelines should be used by event officials or juries in deciding what action to take.
- 3.2.2 Any breach of the rules could potentially lead to a competitor complaint but it is hoped that complaints will not be made against trivial infringements that are highly unlikely to affect the outcome of a race. A serious problem is more likely to affect a race and could include a control which is either missing or misplaced to such an extent that it can not be found close to, and clearly visible from, the correct location. Placement of a control in an area so badly mapped as to make navigating to the control unfairly difficult or the hiding of a control in thick vegetation could also be defined as a serious problem. Identification of a serious problem would not necessarily be grounds for taking action without considering what effect this problem would have on the outcome of a race. If the problem has a minimal effect on the race then no action should be taken. Defining minimal effect is rather subjective but the following criterion is recommended:
- 3.2.3 The primary purpose of an orienteering race is to determine the best orienteers on the day. If it can be established that a serious problem is unlikely to have affected the top runners in a race then no action should be taken since the winners of the race will be determined by who completed the designated race in the quickest time. How many runners should be considered the top runners depends on the nature of the event and the total number of competitors in that race. It could vary from one to six. Whether or not one or more of the top runners was affected by the problem can be ascertained by comparing race times before and after removal of splits either side of the problem. If a top competitor's position in the race is lower in the unadjusted results than in the adjusted results list then the race could be considered to have been seriously affected. Of course it would need to be determined that the serious problem existed when that top competitor was in the relevant area, i.e. that the difference in position was not due to competitor error at a control that may have been absent or misplaced at some time but had been correct at the time that that competitor reached it. Even if the problem has affected the top runners it should be recognised that there is likely to be a certain amount of "noise" in an orienteering race i.e. small time losses by individual runners due to

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uncontrollable events during a race (eg a fallen tree on one particular route choice). Therefore if the effect of the error is to change the order of the top runners, but only as a result of a few seconds adjustment, then the organiser might feel that it would be best not to void the race or adjust the results.

3.2.4 Whilst the above criterion should be used to determine whether or not a major event has been significantly affected it could be broadened for events at a lower level. Whilst determining the fair winners of these races remains important, more importance should be placed on the effect that a serious problem could have on other competitors. For local league events for example a problem that affects just a few competitors could be considered significant.

3.2.5 If a serious problem has been identified then a decision must be made as to what action to take. For level 1 events the following is recommended:

1) If a problem is found to have affected the outcome of a race according to the above criterion then the recommended solution is to void the course. In line with IOF policy, splits removal shall not be considered as an option.

2) If a serious problem is identified, but by using the criterion defined above, is not considered to have significantly affected the outcome of the race, then the results should be published without adjustment, other than to re-instate any competitor who failed to punch at a control that was missing or misplaced when they reached it.

For events at a lower level then the option to remove splits either side of a problem control, or to start or finish the race at an alternative point, can be considered as a possible solution to an affected race. The decision whether or not to adjust the results however is still not one that should be taken lightly. Removing splits can have dramatic effects on the outcome of the race and may not be justified if only a few competitors are affected.

3.2.6 It is important that decisions made by the organiser or jury are clearly explained to the competitor in the published results. Even if a problem is deemed not to have affected the outcome of a race significantly enough to warrant voiding, or results adjustment, the problem should still be acknowledged. In such cases where a problem is acknowledged then consideration should be given as to whether to offer refunds to affected competitors. If a course has to be voided then split times should still be published since these can still be of interest to competitors and potentially also selectors.

3.3 Conclusions

3.3.1 There are no simple rules that can be defined as to what action to take when a problem arises since different outcomes are warranted depending on the exact circumstances. Decisions will need to be subjective at times but this appendix should help guide officials towards an appropriate course of action. What needs to be made clear is what action should be taken during the race should a problem arise. This guideline encourages the following courses of action:

1) If a problem is discovered, organisers should attempt to correct it as soon as possible.

2) If a competitor encounters a problem with a control they should, however hard it may seem, endeavour to continue the race without pre-judging the outcome of any protest or ruling on the problem.

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4. Controlling Considerations

4.1 Factors to Consider

4.1.1 In general the role of the Controller is as for any event. There are certain areas where extra care should be taken when using EPS, and where the Controller may want to ask specific questions:

Are all event officials familiar with the system in use?

Have the preparation of controls and the control hanging process been carefully planned, and are sufficient resources and time available?

Will all the controls be checked on the morning allowing sufficient time to replace any defective units?

How will the start be run?

How will the finish be run?

What contingency plans are in place to handle equipment failure (particularly of computers)?

What back-up timing facilities are available?