Run Course Measurement Manual
2010 Edition

1.1. Introduction

This document is based on the contents of the International Association of Athletics Federation (www.iaaf.org) and the Royal Spanish Federation of Athletics (www.rfea.es), with the necessary adaptations for the Spanish Triathlon Federation.

The official measurement of the run course will only be certified by the Technical Delegate or by an official appointed by him, on the assumption of "zero tolerance" in the measurement. The exact distance must be notified at the pre-race briefing.

The distance must be measured, in all distances, in the shortest possible course a competitor can follow inside the course.

We will follow two measurement procedures to create the validation or certification of a race:

- The '***route***' procedure is used when plotting the track of a course. Here we will monitor the run course with the LOC. Take note of the turnings if it is a winding course;
- We need to know if we will be able to make use of the whole pavement or only part of it;
- If the 'route' procedure is done properly, we will get a perfectly measured course; and
- The process of ***'measurement'*** is used by the 'measurer', who is the person appointed to check the length of the course for validation.

For this we will use the ***measuring wheel***. It is necessary to validate the calibration of the wheel of measuring. We will use a metric tape of at least 25 meters, and we measure this distance with the wheel.

1.2. Run course definition

This one is the most important step at the moment of measuring a course. Before we could measure something we must know what to measure and it is necessary to know what sections of the course will be available for the athletes. Will they have the complete street from sidewalk to sidewalk? Will they run from the right or from the left side? The whole course will be over asphalt?

If it hopes that the athletes go one side of the road or way, this can cause uncertainty at the moment of measuring the corners or pronounced (marked) curves. The exact course should be defined by fences the day of the course about every restricted corner. It is a responsibility of the official in charge of measuring to indicate the above mentioned fences with accuracy. The result of the work will be a map that shows the complete course of the race. The map must be the sufficiently good thing in order that a stranger, using only the map, measures exactly what has been done before. If the tour has many restrictions, these must appear clearly in the map.

1.3. Make it simple

The easiest way to define a course is to assume that the triathletes will have access to the road or path in full.
But, if the course has many restrictions and fences, it can prove short if the LOC omit or misplace the fences. So, it is important to make the course as simple as possible.

1.4. The shortest possible course

Once the limits of the run course have been determined, we are ready to measure. ***The measured course must be the shortest possible one*** inside the limits of the running course. We must follow the imaginary straight line when measuring. This is the correct path to follow. This means we must measure by getting close to the turning interior borders.

We have to take into consideration the start of the run course, that for us will always be the ***middle point of the width*** of the start gantry (duathlon, cross duathlon, aquathlon, winter triathlon) or the exit of the transition area (triathlon, triathlon cross).
The measured track must be **30cm** from the kerb or the outer part of the course. Try to keep this distance in turnings and corners. We suggest walking close to the kerb, and keeping the wheel with the opposite hand.

1.5. The run course map

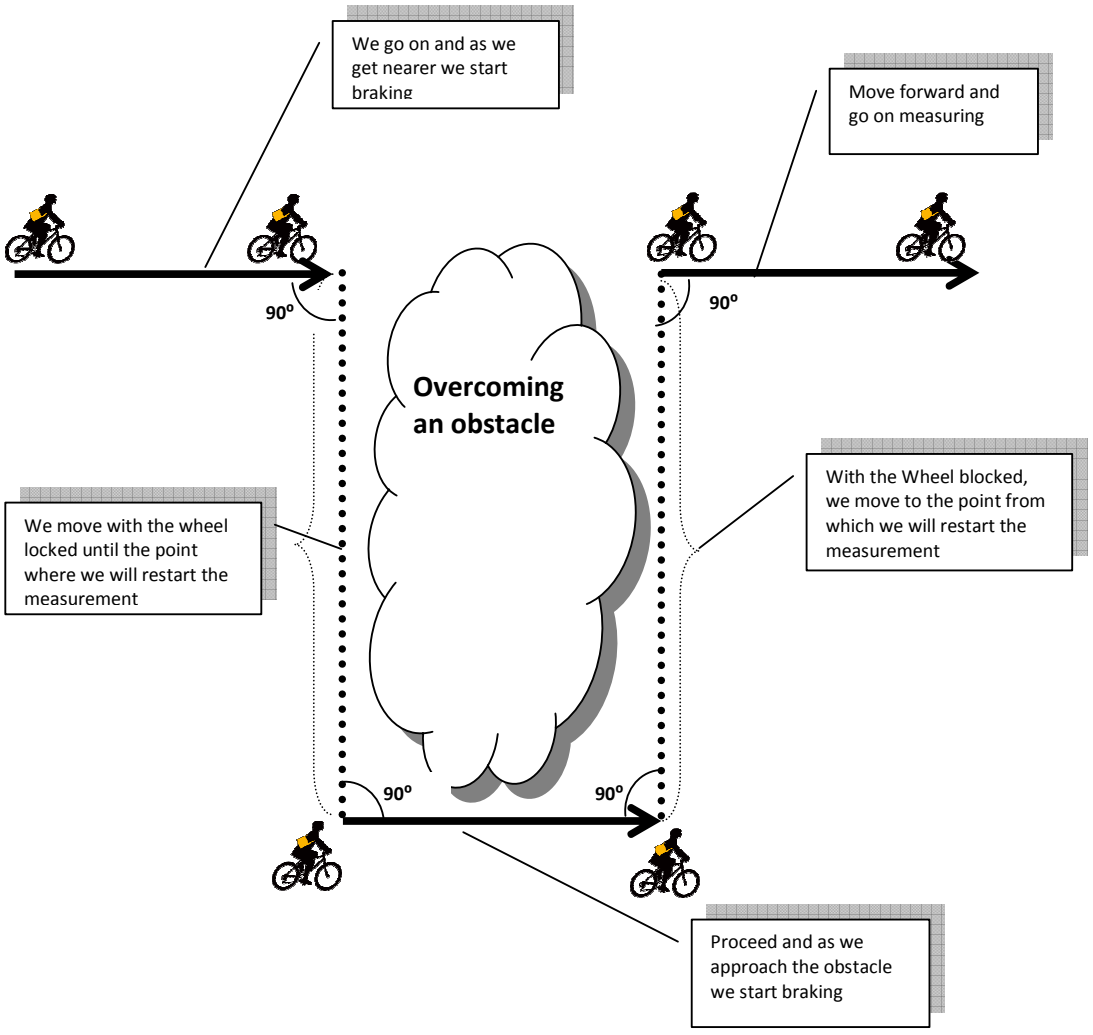
We need to report our measurement and if this is not done in the correct way, the measurer will be the only person who knows it, where it starts or finishes. Spray-paint the ground is not enough. The map must be good enough in order that the technical delegate or the organizer could return to plan the course, even if roads are going to be paved again.
Drawing a map is as important as measuring the track. The purpose of the course is to give information. It must show the route in a clear manner, with all the streets, roads and paths the course makes use of.
The map must show clearly the route of the course and all the streets, roads or ways that it uses. Include all the notes that are necessary to have a totally clear route. The good maps generally are not shown to scale. The portions can be longer or sorted to show the details.
The map must describe the positions of the exit, the finish area and any turning point, also the last kilometer (optionally the last 500m), as well as the locations of the aid stations and signs of 200m distance to them, using the marked distances with tape. These descriptions must be sufficiently clear as to allow that a stranger should replace with accuracy the points, even after the road had been paved and of that had eliminated all the marks that they had put.
If a tour has been planned so that the athletes could use the whole road, causeway or way, the map will be easier to draw.
If the route is restricted (the whole road is not available) the map must show with accuracy how it must guide to the athletes towards the right course.

1.6. Measurement equipment

1. **Measuring Wheel.** In good conditions. Better with brake.
2. **Calculator**. More reliable one using batteries when measuring in darkness.
3. **Notepad, pen, etc.** A pocket-size notebook, pen and pencil.
4. **Highlighter pen or chalk**.

1.7. Compensation maneuvers

Always try to keep yourself in the correct measurement line. Now and then there will be an obstacle in the course, so try to turn off to avoid it. This way the measurement will not be considerably affected. You can also use a compensation manoeuvre (see diagram) to surround the obstacle.
If the obstacle takes a long straight part of the course, simply make a gradual movement to one side to surpass it. If there is a car parked in the interior of a bend, get to the bumper, block the wheel or look at the mark and move to a side until you go have a free space in front. Now, roll the wheel until you go past the car, block it again or look at the mark, place the wheel towards the correct line and continue with the measurement.


We go on and as we get nearer we start braking
Move forward and go on measuring
90º
90º
Overcoming an obstacle
We move with the wheel locked until the point where we will restart the measurement
With the Wheel blocked, we move to the point from which we will restart the measurement
90º
90º
Proceed and as we approach the obstacle we start braking

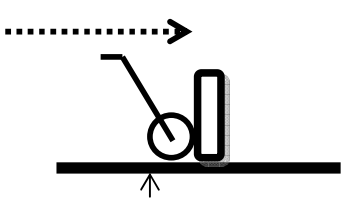
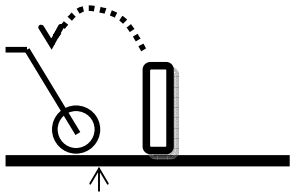
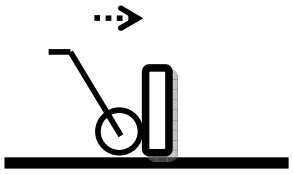
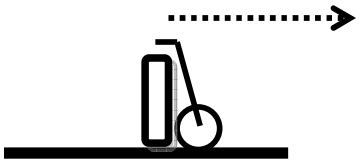
1.8. Measuring non-asphalt surfaces

Walk more slowly when it is an uneven surface to avoid the bumping. Try to slide the whole wheel surface. Here the measurement will be slower.

1.9. Mis-defined roadsides

Sometimes roadsides are eroded or in bad conditions. Use your common sense to decide which the shortest available path for runners is. This applies to measurements in cross duathlon and triathlon.

1.10. Measuring through a gate or fence

- Stop at the gate or fence - Mark on the floor the back of the wheel - Block and lift it	**(1)** 
- Place the front of the wheel on the mark and unlock the brake	**(2)** 
- Move forward with the wheel until the gate, block and lift the wheel	**(3)** 
- Place the wheel on the other side of the gate - Put it in such a way that the back of the wheel touches the gate - Unlock the brake and restart the measurement	**(4)** 

1.11. Signs must be placed on the course

FINISH **1Km**	**AID STATION** **200m**

1.12. Different cases according to modalities

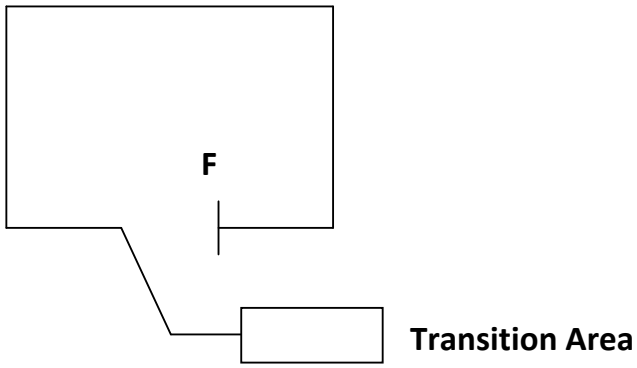
Three main groups:

1. Triathlon, Winter triathlon and Cross Triathlon.
2. Duathlon, Cross Duathlon and Aquathlon.
3. Relay

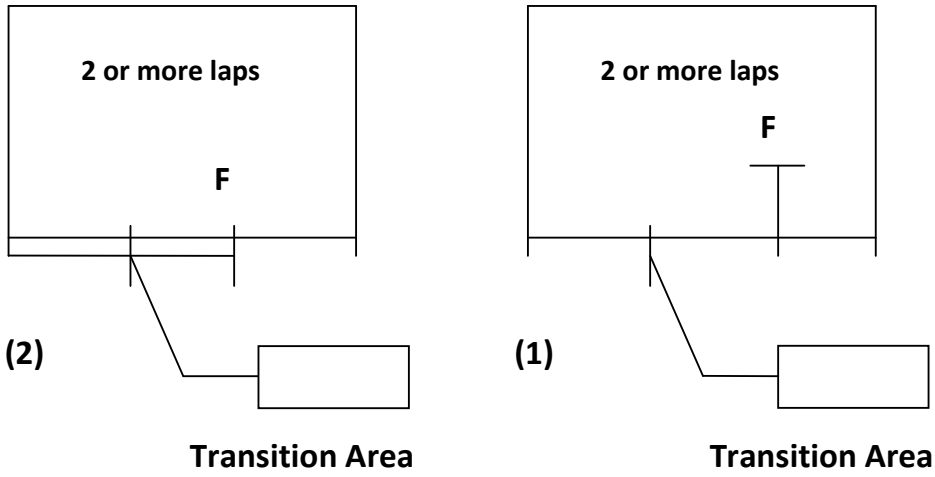
1.13. Special conditioning factors

In triathlon the course to be measured goes from half-way in the transition area to the finish line. Here, we can have two situations:

1. **ONE LAP RUN COURSE**, that is, we go out of the transition area and end on the finish line.



2. **MORE THAN ONE LAP RUN COURSE.** After leaving the transition area we will have a course which, after doing the necessary laps, we will abandon to enter the home stretch (fig. 1) or direct to the finish line, in which case the finish is part of the circular racetrack to be measured (fig. 2).

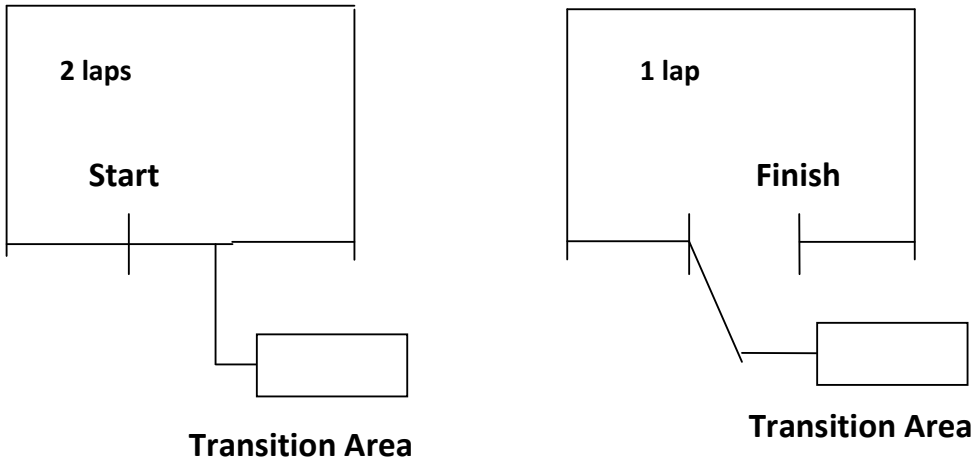


In both cases the distance of each lap needs to be measured and add to it the distance there is from the transition area to the course and from the course to the finish line. Once these distances have been added, we will need to adjust the racecourse so that it has the established measurement.

1.14. Duathlon, duathlon cross and aquathlon

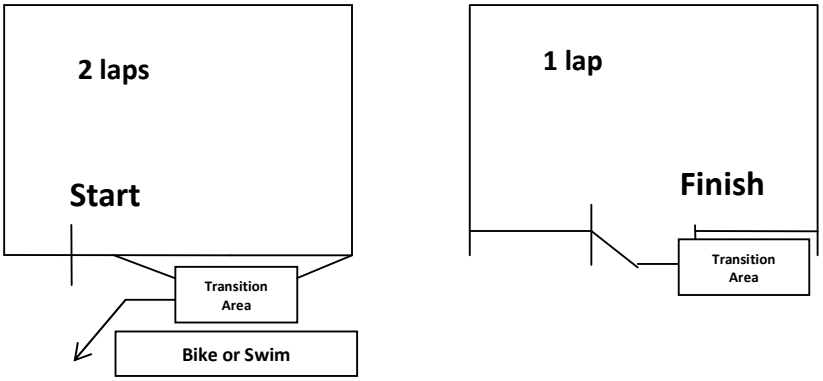
In Duathlon we can find different situations:

1. **The last segment, (one lap) half in distance and in laps than the first section**. In this case, only one lap would be done.



It is very important to measure the distance there is between the end course till the transition area and the distance from the transition area to the entry in the course since the higher these distances, the bigger the adjustments in the run course.

If the transition area is placed racewise, we could obviate these last considerations as the measurement would not virtually alter.



2. **The 1st and 3rd segments in distinct courses**. In this case both courses will be measured independently.

1.15. Relays

In relay competitions we must consider two areas: the ***Relay Area*** and ***Finish Area***. Two situations can occur:

1. **Both areas can have the same location**: In this case the measurement will be the same for the three laps.
2. **The Relay area and the Finish area are located in different places**: In this case we will go through the following premises and in the order specified below, where, if the first premise cannot be accomplished we will go to the next one:
   a. That the distance to the relay area from the point we leave the run course, will be the same as from that point to the finish line. For this to be feasible we have to be flexible to set up both areas (relay and finish).
   b. Taking the last relay adjusted to the rules as the exact measurement, we assume a **5%** tolerance above or below that distance, in which case, none of the measurements would be adjusted. That means that we could have **2,000m** for the last relay, and the first and second could be between **1,900m and 2,100m**
   c. That the difference be between **5%** and **10%**, in which case we would adjust the turning point so that the difference is below that **5%.**

      - Relay 1 and 2 = 1,850m
      - Relay 3 = 2,000m

      2,000m – 1,850m = 150m / 6 = 25m

      We would move the turning point **25m** further so tat they would do: **1,900m + 1,900m, + 2,050m** (within the 5% tolerance margin)

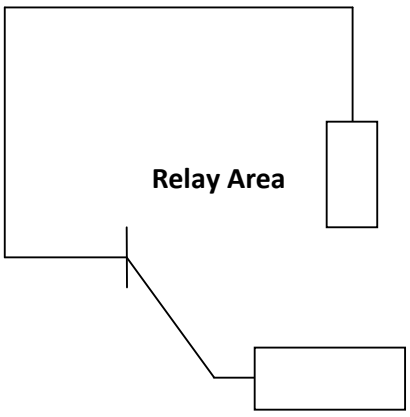
      - Relay 1 and 2 = 2,150 m
      - Relevo 3 = 2,000 m

      2,150m – 2,000m = 150m / 6 = 25m

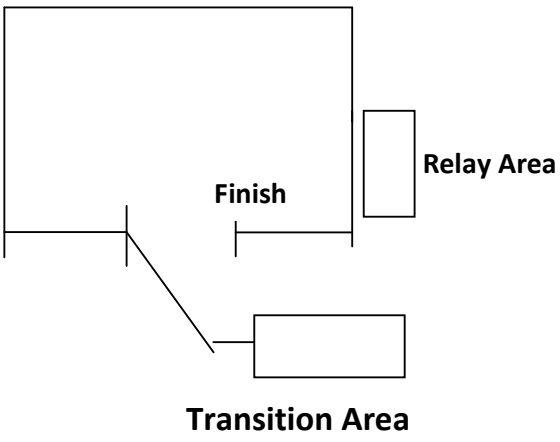
      We would bring the turning point **25m** nearer, so they would do: **1,100m + 2,100m + 1,950m**, (being within that 5% tolerance margin)

   d. Never should the difference between the two courses be over 10%

First and Second Relay



Third Relay

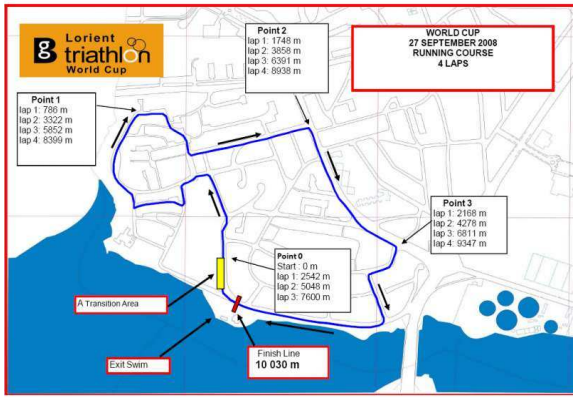


The measurement will be done from the exit of the transition area to the entrance of the relay area (for the first two relays) or finish area (for the last relay)

1.16. Adjusting the measurement

Once the measurement is done we have to proceed to adjust it. Basically we will encounter three possible situations:

1. **One loop course** where we will have the entire road/street used for the course. The adjustment here is quite complex.



2. **Go and return course**. This is the case where using a two-way road/street, one lane is used to get to the turning point and the opposite lane for the way back. In this case we will adjust the turning point.

3. **Mixed course** is a mixture of the previous two, with common parts and unique parts. One of the turning points must be adjusted.

In all the situations, the adjustment of the measurement will be done in that place where we can make the adjustment and that is usually at the far end of the run course, although sometimes it is necessary to move the finish gantry or the exit of the transition area. For that, we must study beforehand all the possible situations in relation to the kind of competition, make the accurate measurements and finally adjust them to the established measurements.

1.17. Example of a real case
(2008 Pulpí U23 European Championships)

The measured course is marked with red arrows, the green arrow is the entrance to the finish area on the last lap. The marks shown correspond to the first measurement made after the course had been agreed on and when we know how much of the road is going to be used.
Several marks are made that will be a reference for possible changes, in case we had to alter the course if the measurement we get is far from our purpose, which in our case is **10,000 m** (4 laps to the course).

We must consider that our most important reference point is the mark made at **2,260.9 m**, since it is on this point where the course splits into two and obliges to another lap or to the finish gantry.

The distance from that point to the finish gantry is **85 m**

Therefore the final measure of the course is:

2,571.1m + 2,571.1m + 2,571.1m + 2,260.9m + 85m = <u>10,059.2m</u>

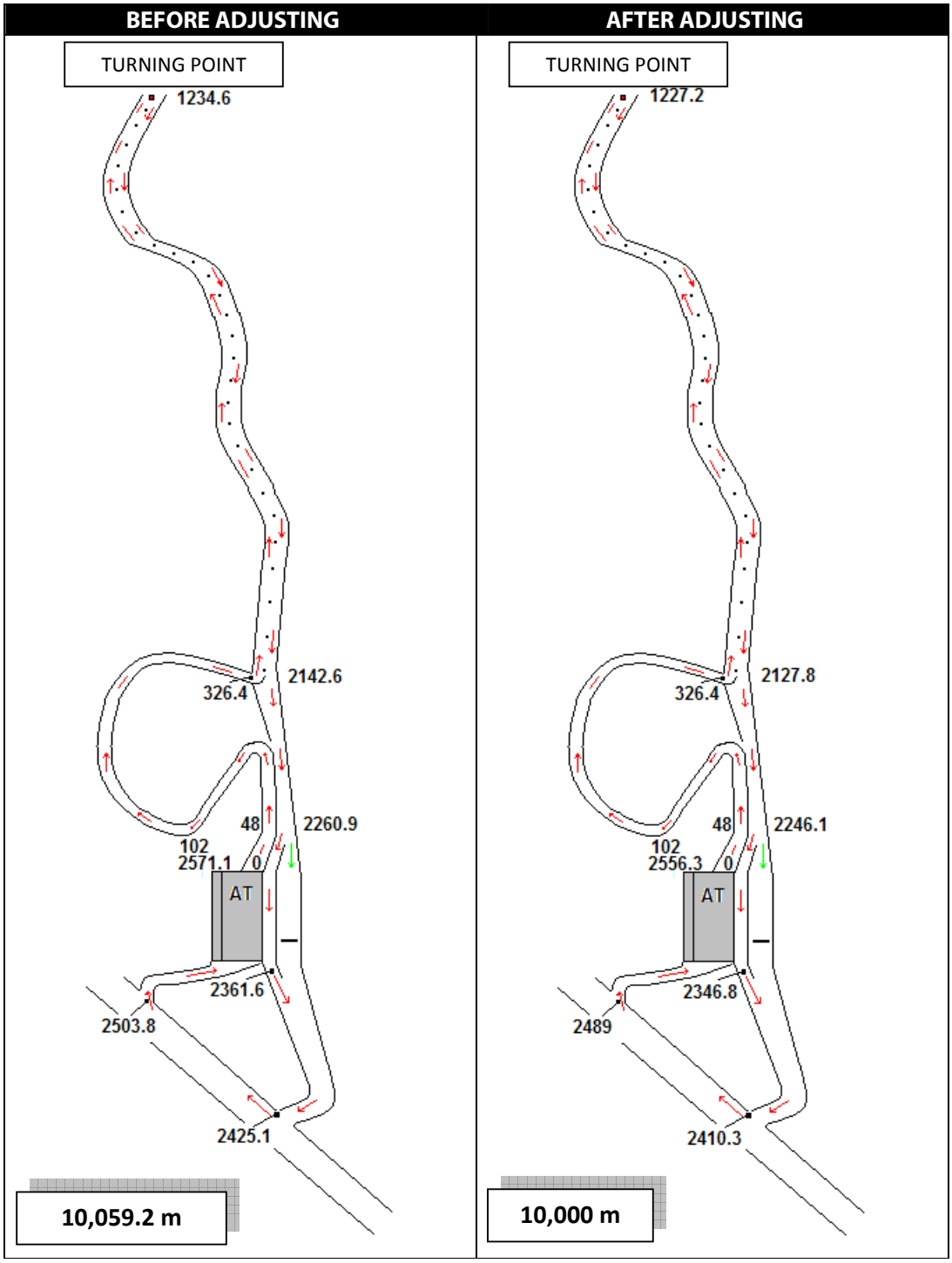
These calculations make us see that we have gone 59.2m far, so we must get the turning point nearer, but how near?

The obvious thing is to divide that distance between 4 (4 laps), so we get **59.2 m / 4 = 14.8 m**
Therefore if we get the turning point **14.8 m** nearer the problem would be solved, as this way we would have the **10,000 m** we want; **BUT LOOK OUT**, it is a turning point. If we get it **14.8m** nearer means that we have to adjust it to: **1,234.6 m – 14.8 m = <u>1,219.8m</u>**

What happens with the subsequent marks? Do we have to take away the **14.8 m**? **NO** is the answer. We have to take away double **29.6 m**, as I am taking away the **14.8 m** to get to the initial turning point and the **14.8 m** to get back from the initial turning point to the desired turning point, so in this case our course would measure:
2,571.1m – 29.6 m = 2,541.5 m and 2,260.9 m – 29.6 m = <u>2,231.3 m</u>
2,541.5m + 2,541.5 m + 2,541.5 m + 2,231.3 m + 85 m = <u>9,940.8 m</u>

Now we can see that our course is nearly **60 m** short. If our aim is to take away **14.8 m**, we will have to bring the turning point (half that distance) nearer, that is **7.4m**, and the result will be:
2,571.1 m – 14.8 m = 2,556.3 m & 2,260.9 – 14.8 m = <u>2,246.1 m</u>

Result ⇨ **2,556.3m + 2,556.3m + 2,556.3m + 2,246.1m + 85m = <u>10,000m</u>**


BEFORE ADJUSTING
TURNING POINT
1234.6
2142.6
326.4
48
2260.9
102
2571.1
0
AT
2361.6
2503.8
2425.1
10,059.2 m
AFTER ADJUSTING
TURNING POINT
1227.2
2127.8
326.4
48
2246.1
102
2556.3
0
AT
2346.8
2489
2410.3
10,000 m