Referee allocation in Engarde
New method of May 2020

1. Introduction

The revision of January 25, 2021 concerns the allocation of referees by quarter tableau which has been added and is highlighted in yellow.

Referee allocation in Engarde has been profoundly modified. It uses clearer criteria. The user chooses with a slider the strength of each criterion to focus on what is most important in the user's situation. The system has a "Solution List" in which the user installs solutions and can then change the strength of the criteria and try to find better solutions.

The allocation is more automated. You can, for example, ask to put 2 referees per match including a video referee, choose the criteria and have the execution of all the phases without intervening if things go well:
- allocation of a first referee to each match
- allocation of a second referee to each match
- change of role: the second referee becomes the video referee
- Switching between the referee and the video referee is done on some matches to balance the roles between the referees.

Things don't go well especially when there are not enough referees or too many referees from the host nation. In this case, certain criteria need to be relaxed. It is also possible to make a "phase by phase" allocation in this case. If necessary, it is possible to manually modify a solution.

When there are several referees per match, the use of groups A and B prescribed by the FIE works automatically if requested. It consists of searching to place at least one referee from Group A on each match.

The use of allocation by quarter has been reintroduced in the PRO version.

When there are several tableaux at the same time, such as in FIE team competitions or repechage competitions, it is now easier to load the tableaux concerned together to make a complete allocation of the same time slot in one go. It is not possible to make an allocation by quarter on several tableaux at the same time.

It is possible to favor referees who have refereed less previously in the competition to balance the referees' work a little.

Engarde calculates solutions by using a significant amount of randomness and by favoring at all times the referees who best meet the criteria. At each phase, it generally calculates 80 solutions, a little less if they are similar solutions or if they are very good solutions. It is possible with the "phase by phase" mode to have more solutions calculated to try to find the best ones.

2. Allocation of a referee to each match on a tableau

Assign times and pistes to the tableau matches and then click on the menu of the tableau:

and select "Referee allocation". Add the referees that suit you.

At the top centre, the number of referees per match is 1:
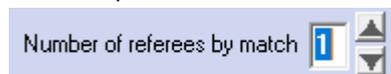
At the top left, with the small arrow, specify the criteria of the affiliations to be taken into account, either the 4 nations system of the FIE competitions, or the Nations- League-Club system, and specify the importance of each one. Below, we ask that there be no conflict of nations between the referee and the fencers, with a maximum importance (8), and we do not take into account the 2 other affiliations.
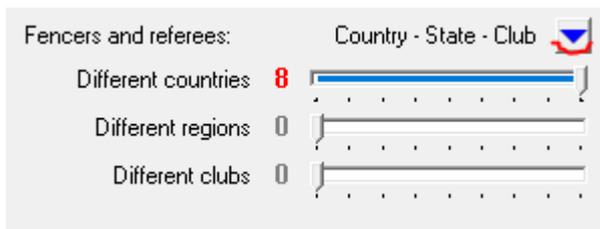
Then, for a first try, leave the criteria as they are:
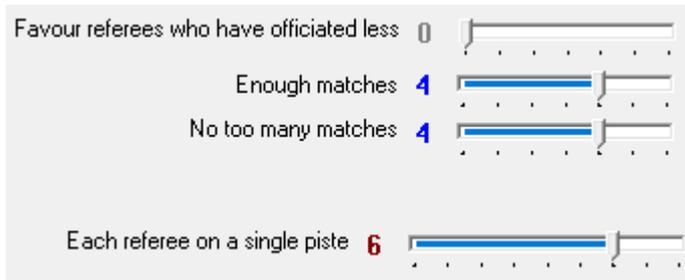
Click on the "Referee allocation" button at the top center. The content of the window changes, we switch to the calculation of several solutions which are presented in small panels such as:

The + button allows you to have more details, in the example above you get:
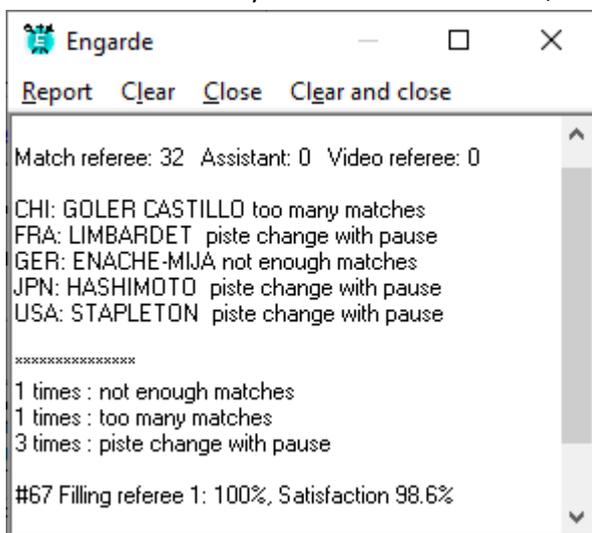
Here, a referee has one match less than desired, a referee has one match more than desired, 3 referees have a "piste change of with pause" (the change of piste is not done on consecutive matches). There can also be "piste change WITHOUT PAUSE" which can be more annoying if the match is late (it adds a delay to the other piste) or if the other piste is in a distant room.
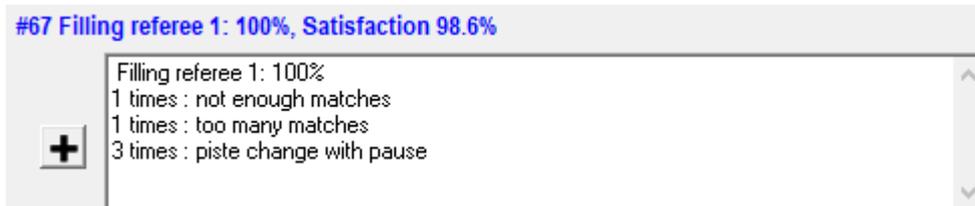
Engarde stopped the calculations and presented its best solution (selected in green) for the chosen criteria. It made between 40 and 80 solution calculations.

And it allows you to continue in 4 ways with the buttons at the top center:
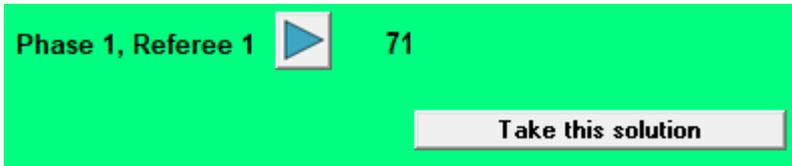
Clicking on the arrow, you ask to calculate other solutions. This sometimes results in better solutions than those of the first calculation set.

Selecting a solution (the first solution is pre-selected, but you can select another one instead) and clicking on the "Take this solution" button, you return to the initial allocation window in which this solution is installed.

Selecting several solutions and clicking on the "Add to solution list" button, you can put these solutions in a list and toggle the display of this list.

Clicking on "Cancel" returns you to the initial allocation window in the state it was before.

Solution List

When we go to the solutions list, we go back to the initial allocation window but with a panel at the top right which is this one:

It allows you to visualize in detail the solutions you have put in the list. It is possible to delete them. With "Take this solution" you return to the initial allocation window in which this solution is installed.
With the gray cross, you go back to the initial allocation window in the state it was.

Interest of the list of solutions

When you have solutions that are not perfect, you can change the criteria to try to find better. It is often interesting to keep one or two imperfect solutions before in case you don't find better solutions.

When you are in the initial allocation window, you can go to the list of solutions at any time with the "View" button:
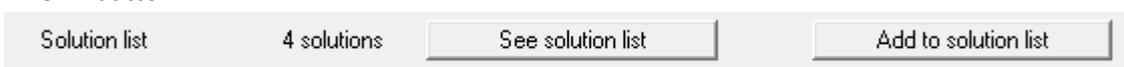
With the "Add" button you can add the current solution to the list.

When starting the Referee allocation with a solution already in place to improve it, it is suggested to do this to be able to use this solution again if the improvement does not work.

Allocation per 1/4 of a tableau (PRO version)

To activate the allocation per 1/4 of a tableau, click on this criteria arrow at the top left:

Par quart ▼

This makes it appear:

Par quart ▼
Bon quart **8**

And at the same time:
- a small panel appears at the top center to assign/modify the 1/4 of a tableau of the referees (you can also use the keys 0, 1, 2, 3, 4):

Boutons pour changer le 1/4 de l'arbitre
| | 1 | 2 | 3 | 4 | ✗ |

- a "Quarter" column appears in the table of referees:

Quarter	Country	Referee
1	FRA	BERTHIER A
1	HUN	NOSEDA Ta

In the FIE rules, the referee delegate provides a list of referees for each quarter. Each referee must be neutral for the quarter, i.e., must have a different nation from all the fencers in the quarter. If this is not respected, Engarde indicates, for example, "2 times: is not neutral on ¼", but still makes the allocation with these referees. It's up to the referee delegate to decide whether he wants to start again with neutral referees or keep what he has obtained.

Modification of the criteria

When a criterion is not well achieved in the solutions obtained, one can try to improve this by giving it a higher value and generally by giving a lower value to other criteria.

If you consider that it is important to have a minimum of "piste change WITHOUT PAUSE", you can give the maximum value to "Each referee on a single piste" and not too large values to "Enough matches" and "Not too many matches". If you consider it more important that the referees have the same number of matches, you can do the opposite.

If your solutions are incomplete, you should investigate the cause. This may be due to a general lack of referees or a lack of referees from foreign nations. In the second case, you can decrease the criterion "Different nations" and you will obtain solutions with a few matches that have a fencer and a referee from the same nation. If this is not acceptable, you can add referees or change the timetables, for example make a tableau 32 on 4 pistes with 8 timetables instead of 8 pistes with 4 timetables.

Favor referees who have refereed less

This criterion, as its name suggests, calls for an attempt to give priority matches to referees who have refereed less previously in the competition. The menu "Document | Favor referees who have refereed less" allows you to see these referees.

When the situation is complicated and it is difficult to find a good enough solution, it is advisable not to use the criterion "Favor referees who have refereed less".

Installing a solution in matches

When you are on the initial allocation window with the solution you want to take, just close the window and it will be installed in the matches. If there were already referees in the matches, a question allows you to install the new solution or to go back to the old one.

3. Allocation of 2 or more referees to each match in a tableau

This type of allocation is only possible in the PRO version.

At the top centre, set the number of referees per match to 2 and tick, or not, the box "Including a video referee":


Two new criteria are emerging.

The "Different affiliations/referees" criterion makes it possible to request that the referees of a match have different nations (or different leagues or clubs).

The FIE's criterion "Use Groups A and B" requires that each referee be assigned a Group A or B to put at least one referee from Group A in each match. The idea is to put the most experienced referees in Group A so that they are with referees who are less experienced.

The use of groups A and B can be combined with quarter table allocation.

The input of groups A and B can be done with the table of referees but also directly in the Referee allocation window.

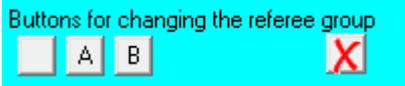To activate the use of groups A and B, click on this criteria arrow at the top left:
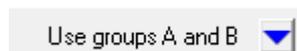
This makes it appear:

And at the same time:

- a small panel appears at the top center to assign/modify groups:

- a "Group" column appears in the table of referees:

Assign the groups to the referees using the buttons on the small panel or the A and B keys. Simply assign the groups A, referees without groups are considered to be in group B. In the case of 2 referees per match, it is generally desirable to have 50% of the referees from group A.

Click on the "Referee allocation" button. The first phase starts with a green panel in the top right corner and the indication:

If it assigns a referee to each match, the second phase follows: phase 2 for referee 2.

As before, it is possible to edit a solution or to put several solutions in the solution list.

If Phase 1 does not assign a referee to each match, it stops. You can then restart it with the button:

So that Engarde can make more attempts.

You can also cancel to modify the criteria and restart a search for solutions.

The button:

allows for a semi-automatic allocation in which more solutions (including better solutions) can be searched for in each phase than with the automatic mechanism.

As before, difficult cases are dealt with by changing the importance of the criteria, adding referees or changing schedules.

The allocation of more than 2 referees per match works in an analoque way by giving at the beginning the value 3 or 4 to the number of referees per match.

4. Manual allocation

It is possible to manually modify a solution. By clicking on one of the arrows:

The edit buttons appear above each table.

For the game table, it's:

Allowing removing a referee from the selected match (here, referee 1 or the video referee) or allowing putting the selected referee on that match.

For the referees' table, it's:

Allowing a match to be removed from the selected referees.

With the buttons:

The edited solution or a phase of it can be deleted.

When there are several referees per match, with the buttons:

It is possible to restart the balancing of the number of matches refereed as the main referee. The result can be seen in the menu "Document | Referees - Statistics".
It is also possible to change the roles, for example to change all referees 2 to video referees or the other way around.

The "Undo" button:

Allows you to undo the last operations performed in the allocation. When used, a "redo" button appears:

5. Several tableaux

When several tableaux start at the same time, put the times and pistes on these tableaux and then click on the menu of one of these tableaux and ask for "Referee allocation". Engarde proposes to process all the tableaux that start at the same time as the chosen tableau. You can accept to process all these tableaux or refuse to process only the chosen tableau.

With the "Pistes - Referees" button in the tables window and the "Referee allocation" choice, you can process several tableaux by choosing the ones you want from a list. In particular, you can process some tableaux that do not yet have their fencers. The mechanism for choosing several tableaux is done according to the Windows technique with Shift-Click and Ctrl-Click.

6. Referee allocation in the poules

Referee allocation in the poules is launched with the button "Pistes- Referees" in the window of the poules and the choice "Referee allocation".

The allocation works the same way. There is no video referee and a maximum of three referees. There is no "Each referee on one piste" criterion.

7. Role of the referees

There are 3 possible roles for referees: (main) referee, video referee and assistant referee.

In the poules, there is no video referee and a maximum of three referees who are main referees.
In the tableaux for individual competitions, there may be one video referee and up to three other referees. Referee 1 is the main referee. Referees 2 and 3 are assistant referees.
In the team competition tableaux, there may be a video referee and three other referees who are main referees.

8. Miscellaneous

It is possible to add and remove referees from the right table with the buttons above the table. When referees are removed, they keep their matches.
When referees with matches have been removed, it is possible to have them reappear with the menu "Referees | Add referees from the left table".

When a solution has conflicts of nations, leagues or clubs, it is possible to remove the referees of these conflicts from the matches with the "Delete conflicts" button on the top right panel.

During the calculation of the solutions, it is possible to use the pause button to stop the calculations, either because very good solutions have been found, or because you want to stop the calculations to change the criteria.

Calculating solutions consumes memory. Some of this memory is not recovered. If you make long calculations, it is suggested that once the chosen solution is implemented in the matches, you exit the Engarde application and restart it. An indicator of memory usage is displayed at the bottom of the window:

Data memory: 6 537 204

When you have exited the referee allocation, if the value exceeds 20,000,000, it is suggested that you quit the Engarde application and restart it.
If you have matches in progress on pistes connected to Engarde Main, do not do so (this is rarely the case when the referees' allocation is made). If you have Auxiliary Engarde connected, don't do anything on the connected Auxiliary Engarde, which resume connection as soon as Main Engarde is restarted.