



**ICC DUCKWORTH-LEWIS-STERN
CALCULATOR
DLS EDITION 2020
(VERSION 4.0)
INSTRUCTIONAL HANDBOOK**

**THIS HANDBOOK
HAS BEEN REVISED BY THE
NSWCUSA SCORERS' COMMITTEE
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“Because scorers count ...”

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BACKGROUND

The original Duckworth-Lewis method of setting target scores in interrupted limited overs matches was developed by Frank Duckworth, a statistician and Tony Lewis, a mathematics lecturer. (The Duckworth-Lewis method became the Duckworth-Lewis-Stern or DLS method when the current custodian Steve Stern, an American mathematician, helped revise the system in 2014). Duckworth and Lewis studied the results of a great number of limited over matches and this has continued with the method revised about every two years. Their initial research established that to evenly balance a match that has been interrupted, the dominant factors to consider were what they called the 'resources available' to each side. The resources are:

1. the number of overs a side is still to receive; and
2. the number of wickets a side has in hand.

Therefore, *when a match is shortened after it has begun*, the resources of one or both teams are depleted and the two teams usually have different amounts of resources for their innings. In this case a revised target must be set.

The DLS method does this in accordance with the relative resources available to the two teams. If stoppages cause the team batting second (which we call Team 2) to have fewer resources available then their target will be revised downwards. If, on the other hand, Team 1's innings has been interrupted, the stoppages usually result in Team 2 having more resources available and then their target is revised upwards to correct for the extra resources they have at their disposal. For a maximum 50 overs per side match, if an interruption occurs during the first innings:

- At the start of the match Team 1 assumes they will have 50 overs to face.
- If rain interrupts play after say the 35th over and the match is reduced to 40 overs a side, the team batting first now only has 5 overs left to set a target whereas they were originally expecting to face a further 15 overs.
- The team batting second, however, knows at the start of their innings that they only have 40 overs to face and therefore have the opportunity to pace themselves accordingly.

However, if the interruption to play occurs while the second team is batting and overs available are lost, they will have to score fewer runs as DLS takes into consideration that they do not have the same quantity of resources available to them as Team 1. So...

- The team batting second automatically assumes that they have 50 overs to face.
- If rain interrupts play after say the 35th over and the overs for the team batting second are reduced to 40, the team batting second now only has 5 overs left to reach the target score, whereas they were expecting to face another 15 overs to reach the total of the team batting first.

The number of wickets in hand is also taken into consideration as part of the DLS calculation. If the team is 8 wickets down at the time play is interrupted, it is unlikely that the last few batters are going to continue to score runs for an extended period. However, if they only have 2 wickets down at the time play is interrupted, then it is more likely that the team will go on to score more runs because they have 8 more batters available.

SOME THINGS TO REMEMBER

The following are some points to keep in mind when using the Duckworth-Lewis-Stern system:

1. At all times it must be remembered that **the target score to win the match is the par score plus one run.**
2. You should always check the playing conditions under which your match is being conducted to ensure that you have the correct information entered under 'Match Type' on the first screen of the calculations.
3. As per the Laws of Cricket, the correctness of the scores is ultimately the responsibility of the umpires. As such, the umpires should ensure the correct figures (runs, wickets etc) have been used in the calculations.
4. The DLS application is designed to be user-friendly. Stick to the principle that every time you have an interruption to play (and overs are lost) you should enter the details by filling in a new row of boxes on the screen.
5. If a match is determined by the DLS method, this must be noted and shown after the result, for instance Team 2 won by 11 runs (DLS Method).

TROUBLESHOOTING

The following may seem obvious but when stressed or under pressure on a match day sometimes the simple things get overlooked. It is recommended (perhaps required) another person, typically your fellow scorer, independently performs the calculation. If you have trouble agreeing or with printing out the tables from the screen, check:

- You are using the correct version of the DLS calculator for your match.
- All numbers are entered into the calculator. The number of overs per innings at commencement is that available to both sides just before the first ball is bowled.
- The power is connected correctly for both the printer and the computer.
- The printer is switched on and that the cable is connected correctly between the computer and the printer.
- That the paper is loaded correctly into the printer.
- The correct printer (make/model) is selected and available from the dropdown list on the print screen menu.

SCENARIOS FOR YOU TO FOLLOW

Please note that in all examples Team 1 refers to the team batting first and Team 2 refers to the team batting second.

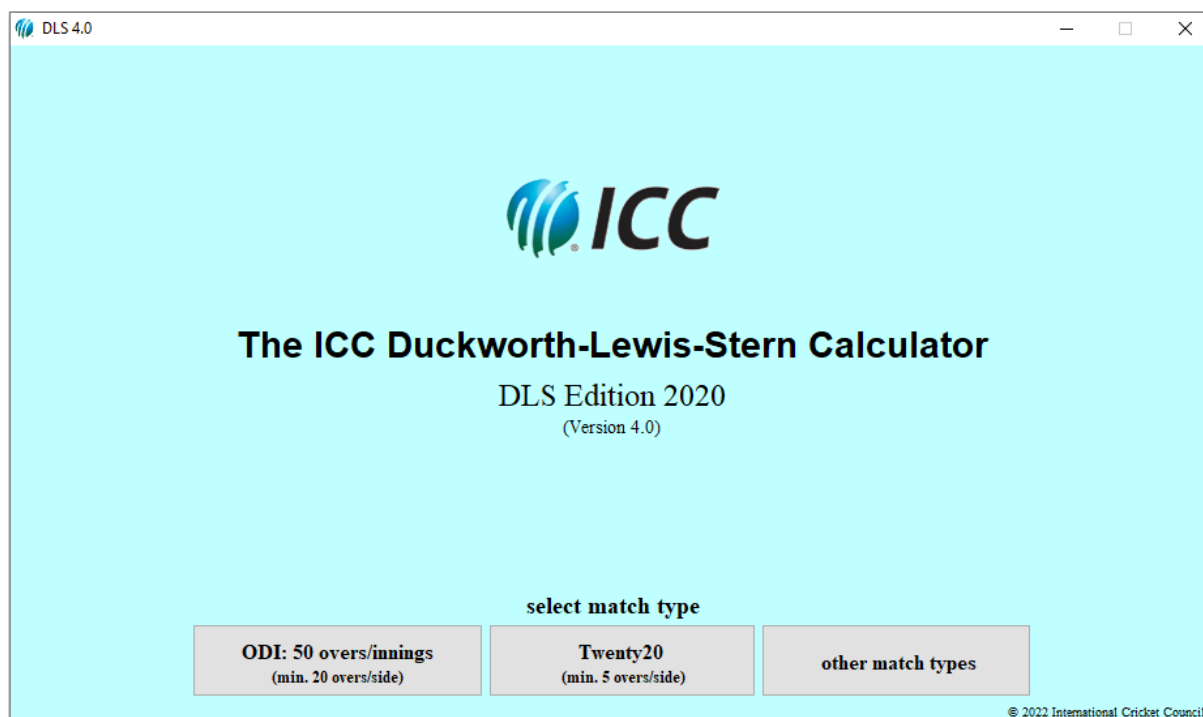
Example 1

Where rain interrupts play during the interval in a 50 overs a side match

Team 1 scored 9 for 238 off their 50 overs. It began to rain during the interval and play did not resume for some time. Team 2's innings was reduced to 30 overs. This is how you calculate the target score for Team 2.

First, select the match type by clicking on the applicable box on the first screen of the DLS Calculator; in this example you would click on ODI: 50 overs/innings (min. 20 overs/side).

Please note that the minimum overs per side can be changed by selecting the 'other match types' box and selecting the appropriate option.



Enter the figures for Team 1 and show the reduction of overs allocated to Team 2.

DLS 4.0 - match type: ODI regulations (50 overs/innings; min. 20 overs/side)

Team 1's innings
overs/innings at start of match:
Team 1's final score:

Team 2's innings
overs at start of innings:
TARGET: 184 (to win)

	overs	balls bowled	runs scored	wickets down	overs lost/side
1					
2					
3					
4					
5					

add further stoppage row

total overs available:

	overs	balls bowled	runs scored	wickets down	overs lost
1					
2					
3					
4					
5					

total overs available:

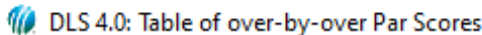
Penalty runs awarded to Team 1 while Team 2 are batting:

create Par Score tables:

As you can see, the target score for Team 2 is now 184. To display and/or print out the par score tables, you simply click on the appropriate box in the bottom left-hand corner of the screen. You can either select over-by-over or ball-by-ball tables.

Below is an example of what is displayed when you click on the 'over-by-over' button. You can opt to either print the table or save the table by clicking on the buttons above the table.

It should be noted that at all times the target to WIN the match is the PAR SCORE PLUS ONE.


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□
×

print table
Table of over-by-over Par Scores
save table

overs bowled	overs remaining	wickets down									
		0	1	2	3	4	5	6	7	8	9
0	30	0	10	23	40	59	83	108	133	155	171
1	29	4	13	26	42	61	83	108	134	155	171
2	28	7	17	29	44	62	84	109	134	155	171
3	27	11	20	32	46	64	85	109	134	155	171
4	26	16	24	35	48	65	86	109	134	155	171
5	25	20	28	38	51	67	87	110	134	155	171
6	24	24	32	41	54	69	88	110	134	155	171
7	23	29	36	45	56	71	89	111	134	155	171
8	22	33	40	48	59	73	91	111	134	155	171
9	21	38	44	52	62	76	92	112	134	155	171
10	20	43	49	56	66	78	94	113	134	155	171
11	19	48	53	60	69	81	95	114	135	155	171
12	18	53	58	65	73	83	97	115	135	155	171
13	17	59	63	69	77	86	99	116	135	155	171
14	16	65	68	74	81	90	102	117	136	155	171
15	15	70	74	79	85	93	104	118	136	155	171
16	14	76	79	84	89	97	107	120	137	155	171
17	13	82	85	89	94	101	110	122	138	155	171
18	12	89	91	94	99	105	113	124	138	156	171
19	11	95	97	100	104	109	116	126	140	156	171
20	10	102	104	106	110	114	120	129	141	156	171
21	9	109	111	113	115	119	124	132	142	156	171
22	8	116	118	119	121	124	129	135	144	157	171
23	7	124	125	126	128	130	134	139	147	158	171
24	6	132	132	133	134	136	139	143	149	159	171
25	5	139	140	141	142	143	145	148	153	160	171
26	4	148	148	148	149	150	151	153	157	162	171
27	3	156	156	156	157	157	158	159	161	165	172
28	2	165	165	165	165	165	166	166	167	169	173
29	1	174	174	174	174	174	174	174	174	175	176
30	0	183	183	183	183	183	183	183	183	183	183

Below is part of what is displayed when you click on the 'ball-by-ball' button. Obviously, this option is considerably longer to print out in full! You can opt to either print the table or save the table by clicking on the boxes at the top of the table.

It should be noted that at all times the target to WIN the match is the PAR SCORE PLUS ONE.

DLS 4.0: Table of ball-by-ball Par Scores

print table

Table of ball-by-ball Par Scores

save table

overs.balls bowled	overs remaining	wickets down									
		0	1	2	3	4	5	6	7	8	9
0	30	0	10	23	40	59	83	108	133	155	171
0.1	29.5	0	11	24	40	60	83	108	133	155	171
0.2	29.4	1	11	24	40	60	83	108	133	155	171
0.3	29.3	2	12	25	41	60	83	108	134	155	171
0.4	29.2	2	12	25	41	60	83	108	134	155	171
0.5	29.1	3	13	25	41	61	83	108	134	155	171
1	29	4	13	26	42	61	83	108	134	155	171
1.1	28.5	4	14	26	42	61	83	108	134	155	171
1.2	28.4	5	15	27	42	61	84	109	134	155	171
1.3	28.3	5	15	27	43	61	84	109	134	155	171
1.4	28.2	6	16	28	43	62	84	109	134	155	171
1.5	28.1	7	16	28	43	62	84	109	134	155	171
2	28	7	17	29	44	62	84	109	134	155	171
2.1	27.5	8	17	29	44	62	84	109	134	155	171
2.2	27.4	9	18	30	44	63	84	109	134	155	171
2.3	27.3	9	19	30	45	63	85	109	134	155	171
2.4	27.2	10	19	31	45	63	85	109	134	155	171
2.5	27.1	11	20	31	46	64	85	109	134	155	171
3	27	11	20	32	46	64	85	109	134	155	171
3.1	26.5	12	21	32	46	64	85	109	134	155	171
3.2	26.4	13	22	33	47	64	85	109	134	155	171
3.3	26.3	13	22	33	47	65	85	109	134	155	171
3.4	26.2	14	23	34	48	65	86	109	134	155	171
3.5	26.1	15	23	34	48	65	86	109	134	155	171
4	26	16	24	35	48	65	86	109	134	155	171
4.1	25.5	16	25	35	49	66	86	109	134	155	171
4.2	25.4	17	25	36	49	66	86	110	134	155	171
4.3	25.3	18	26	36	50	66	86	110	134	155	171
4.4	25.2	18	26	37	50	67	87	110	134	155	171
4.5	25.1	19	27	37	50	67	87	110	134	155	171
5	25	20	28	38	51	67	87	110	134	155	171
5.1	24.5	20	28	38	51	68	87	110	134	155	171
5.2	24.4	21	29	39	52	68	87	110	134	155	171
5.3	24.3	22	30	40	52	68	88	110	134	155	171
5.4	24.2	23	30	40	53	68	88	110	134	155	171
5.5	24.1	23	31	41	53	69	88	110	134	155	171
6	24	24	32	41	54	69	88	110	134	155	171
6.1	23.5	25	32	42	54	69	88	110	134	155	171

Example 2

Where rain interrupts Team 2's innings in a Twenty20 match

Team 1 score 168 runs in 20 overs. Team 2 scores 2 for 80 after 12.2 overs when rain causes the loss of 3 overs. Calculate the revised target score for Team 2.

Enter Team 1's score of 168 and the overs, runs and wickets for Team 2 as at the time of the stoppage.

DLS 4.0 - match type: Twenty20 (20 overs/innings; min. 5 overs/side)

Team 1's innings

overs/innings at start of match:

Team 1's final score:

	overs.balls bowled	runs scored	wickets down	overs lost/side
1				
2				
3				
4				
5				

add further stoppage row

total overs available:

Team 2's innings

overs at start of innings:

Team 2 are behind by 12 (Par Score = 92)

TARGET: 169 (to win)

	overs.balls bowled	runs scored	wickets down	overs lost
1	12.2	80	2	
2				
3				
4				
5				

total overs available:

Penalty runs awarded to Team 1 while Team 2 are batting:

create Par Score tables:

NOTE: Enter 'a' to abandon innings or '?' to get table of possible Targets

You also have the options here to enter 'a' to abandon the innings (if the match has been called off at this stage) or '?' for a table of possible Targets.

If you now input that 3 overs have been lost in the 'overs lost' box, you will get the following screen.

DLS 4.0 - match type: Twenty20 (20 overs/innings; min. 5 overs/side)

Team 1's innings

overs/innings at start of match:

Team 1's final score:

	overs.balls bowled	runs scored	wickets down	overs lost/side
1				
2				
3				
4				
5				

total overs available:

Team 2's innings

overs at start of innings:

Revised Target: 143 (17 overs)
(63 further runs in 4.4 overs)

TARGET: 143 (to win)

	overs.balls bowled	runs scored	wickets down	overs lost
1	12.2	80	2	3
2				
3				
4				
5				

total overs available:

Penalty runs awarded to Team 1 while Team 2 are batting:

add further stoppage row

create Par Score tables:

The screen now shows that Team 2 requires a total of 143 to win.

Example 3

Where rain reduces the overs for both teams and then rain terminates Team 1's innings and there is an interruption to Team 2's innings in a 50 overs a side match

Early rain reduces the game to 40 overs a side. Team 1 is 7 for 135 off 36.2 overs when rain stops play and their innings is terminated. The umpires advise that Team 2 will only face 36 overs. After 5 overs Team 2 is 1 for 19 when it rains again and a further 5 overs are lost. Calculate the revised target score for Team 2.

Change the overs/innings box to 40 overs a side and enter Team 1's overs, runs and wickets and 'a' for abandon innings in the overs lost box. The screen will automatically show the reduction of overs to Team 2 as 36 overs and the target score of 146.

DLS 4.0 - match type: ODI regulations (50 overs/innings; min. 20 overs/side)

Team 1's innings
overs/innings at start of match:
Team 1's final score:

	overs.balls bowled	runs scored	wickets down	overs lost/side
1	36.2	135	7	a
2				
3				
4				
5				

add further stoppage row

total overs available:

Team 2's innings
overs at start of innings:
TARGET: 146 (to win)

	overs.balls bowled	runs scored	wickets down	overs lost
1				
2				
3				
4				
5				

total overs available:

Penalty runs awarded to Team 1 while Team 2 are batting:

create Par Score tables:

Now enter the overs, runs, wickets and overs lost (5 in this instance) for Team 2.

(Note: Before you enter the overs lost (5) in the 'overs lost' box, you will again get the screen giving you the options of 'a' to abandon the innings or '?' for a table of possible targets but we have simply shown the screen after the overs lost have been entered for this example.)

DLS 4.0 - match type: ODI regulations (50 overs/innings; min. 20 overs/side)

Team 1's innings

overs/innings at start of match:

Team 1's final score:

	overs.balls bowled	runs scored	wickets down	overs lost/side
1	36.2	135	7	a
2				
3				
4				
5				

total overs available:

Team 2's innings

overs at start of innings:

Revised Target: 134 (31 overs)
(115 further runs in 26 overs)

TARGET: 134 (to win)

	overs.balls bowled	runs scored	wickets down	overs lost
1	5	19	1	5
2				
3				
4				
5				

total overs available:

Penalty runs awarded to Team 1 while Team 2 are batting:

add further stoppage row

create Par Score tables:

The revised target for Team 2 is 134 off a total of 31 overs.

Example 4

Where rain terminates Team 1's innings then rain terminates Team 2's innings in a Twenty20 match.

Team 1 are 4-76 off 12.4 overs when rain terminates their innings. Team 2 are 5-54 off 9.2 overs when rain terminates their innings. What is the result of the match?

Enter the overs, runs and wickets for Team 1 and type in 'a' for abandon innings. The screen will show that Team 2 requires 85 runs to win.

DLS 4.0 - match type: Twenty20 (20 overs/innings; min. 5 overs/side)

Team 1's innings

overs/innings at start of match: 20
Team 1's final score: 76

	overs.balls bowled	runs scored	wickets down	overs lost/side
1	12.4	76	4	a
2				
3				
4				
5				

add further stoppage row

total overs available: 12.4

Team 2's innings

overs at start of innings: 12
TARGET: 85 (to win)

	overs.balls bowled	runs scored	wickets down	overs lost
1				
2				
3				
4				
5				

total overs available: 12

Penalty runs awarded to Team 1 while Team 2 are batting:

create Par Score tables:

over-by-over

ball-by-ball

reset input fields

change match type

create DLS match report

Now enter the overs, runs and wickets and 'a' for abandon innings for Team 2.

DLS 4.0 - match type: Twenty20 (20 overs/innings; min. 5 overs/side)

Team 1's innings

overs/innings at start of match:

Team 1's final score:

	overs.balls bowled	runs scored	wickets down	overs lost/side
1	12.4	76	4	a
2				
3				
4				
5				

total overs available:

Team 2's innings

overs at start of innings:

TARGET: (to win)

TEAM 1 win by 10 runs (Par Score at end = 64)

	overs.balls bowled	runs scored	wickets down	overs lost
1	9.2	54	5	a
2				
3				
4				
5				

total overs available:

Penalty runs awarded to Team 1 while Team 2 are batting:

add further stoppage row

create Par Score tables:

The screen clearly shows the match result that Team 1 win by 10 runs (DLS Method).

MORE SCENARIOS FOR YOU TO PRACTICE

Please note that in all examples Team 1 refers to the team batting first and Team 2 refers to the team batting second.

Scenario 1

Where rain reduces the overs for both teams and there is a further interruption to Team 2's innings in a 50 overs a side match

Early rain reduces the match to 40 overs per side. Team 1 scored 8 for 141 off their allocated 40 overs. Team 2 reaches 2 for 27 off 6.2 overs when rain interrupts play again. When play resumes the umpires advise that three overs have been lost. Calculate the revised target score for Team 2.

(Answer: Team 2 requires a total of 137 runs to win)

Scenario 2

Team 1 is all out in less than 20 overs and there is an interruption to Team 2's innings in a Twenty20 match

Team 1 were all out for 102 in 17.6 overs. Team 2 had reached 4 for 50 in 6.4 overs when rain stops play. What was the par score at the stoppage? When the game resumes 7 overs have been lost. Calculate the revised target score.

(Answer: Par score at stoppage is 41. On resumption Team 2's target to win is 78 runs)

Scenario 3

Team 1's innings is interrupted by rain reducing the match to a 40 overs per innings match in a 50 overs a side match

Team 1 scores 5 for 143 in 30 overs when rain stops play. The umpires advise that the game has been reduced to a 40 overs per innings match. Team 1 resumes their innings and go on to make a total of 10 for 200 in their 40 overs. Calculate Team 2's target score.

(Answer: Team 2 requires a total of 204 runs to win)

Scenario 4

Team 2's innings was abandoned when rain stopped play in a Twenty20 match

Team 1 made 8 for 151 in their 20 overs. Team 2 had reached 5 for 124 off 16.1 overs when rain stopped play and the match was eventually abandoned. Which side won and by what?

(Answer: Team 2 won by 6 runs (DLS Method))