Asset reliability record — each asset's own Weibull fit from its failures

Menu: CMMS ▸ Assets… ▸ the Reliability tab

Part 1 — What the function does

What it calculates. Every equipment asset in the CMMS file carries its own reliability record. ReliaEn fits a two-parameter Weibull life distribution by maximum likelihood to the times to failure of the asset's coded corrective work orders, with the hours run since the last failure counted as one survivor (right-censoring).

Card on the tab	What it gives
Fitted model	The Weibull shape β̂ and scale η̂ with their 95% bounds, the number of failures and suspensions, the mean time to failure (MTTF) and the B10 life
History	The mean time between failures (MTBF) and the mean time to repair (MTTR); the age since installation; the running time since the last failure; the dates of the first and last failure
Now	The hazard rate and the reliability R at the current running time; the remaining useful life (RUL), median and 95% lower bound
Data quality	How many corrective work orders have no failure code and were therefore left out of the fit

From which data. The asset's coded corrective work orders and primary hour meter, already in the CMMS file. The record is fitted again whenever such a work order is completed or closed with a coded failure event, and when you click Refit now.

When an engineer uses it. To see whether one asset wears out (β̂ above 1) or fails at random, and how much useful life it has left.

When not to use it.

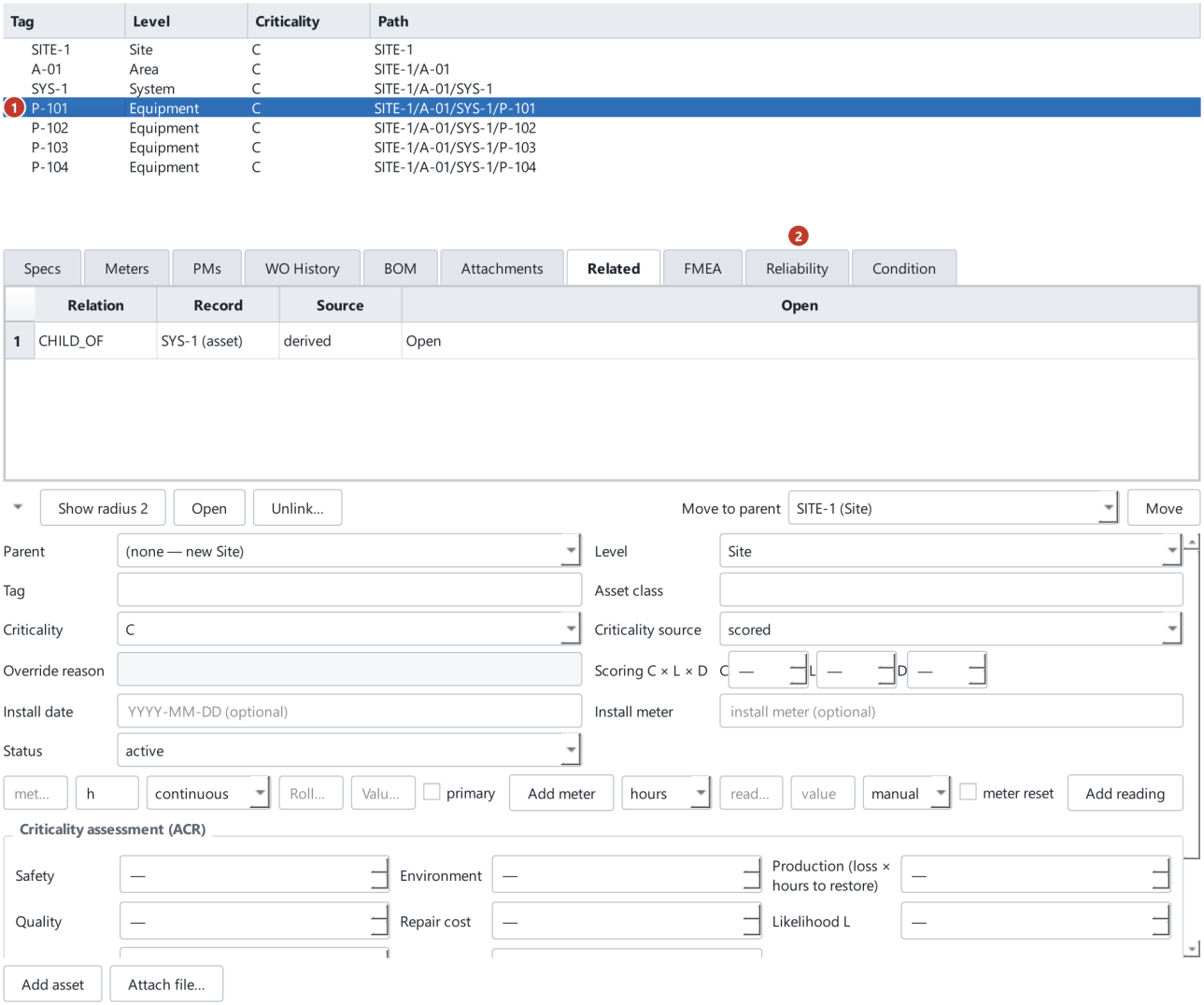
Situation	Use instead
You want a different life distribution, or the failure times of several assets together	Life Data ▸ Time Dependence
The asset is repaired rather than renewed at each failure	Life Data ▸ Repairable Systems ▸ GRP / Kijima…

Part 2 — The example's input data

Setting. The reliability engineer reviews the six failures of pump P-101 before the next shutdown. Installed on 2024-09-12, its hour meter starts at 0; every failure is a coded corrective work order with the meter reading.

Failure	Date	Meter reading (h)	Downtime (h)
1	2024-11-01	1200	4
2	2025-01-17	3050	6
3	2025-04-27	5450	5
4	2025-09-03	8550	8
5	2026-02-13	12450	3
6	2026-08-23	17050	7

Input	Value
File in the worked-example zip	6-Asset-Reliability-Record/reliability_plant.reliaen - the plant's four pumps and fans with their work orders; the records were fitted on 26 September 2026 and are stored in the file

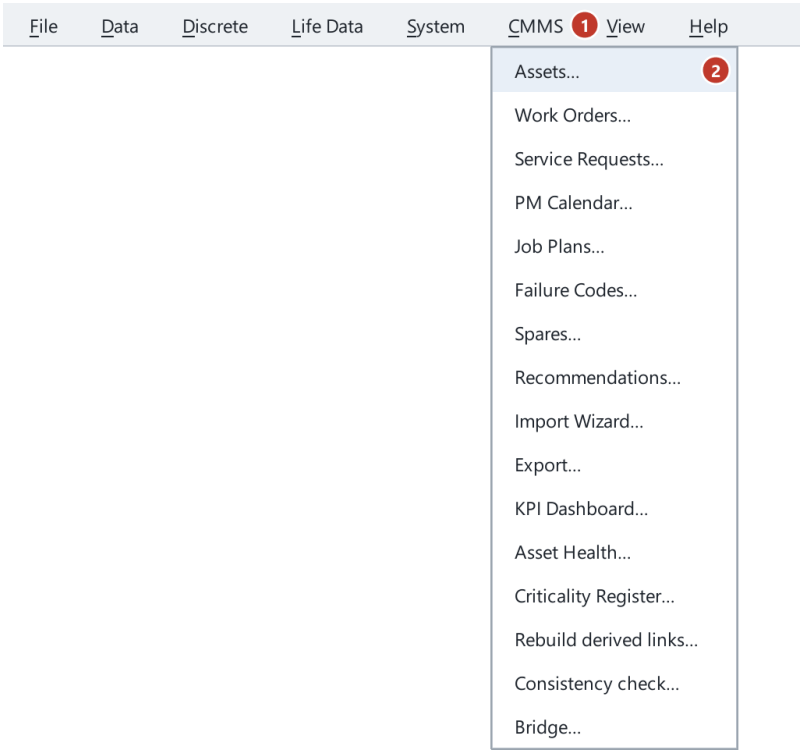


The example data: P-101 in the asset tree

- ① P-101: the pump of this example, in the plant's asset tree.
- ② The Reliability tab: the pump's reliability record.

Part 3 — How to use it, step by step

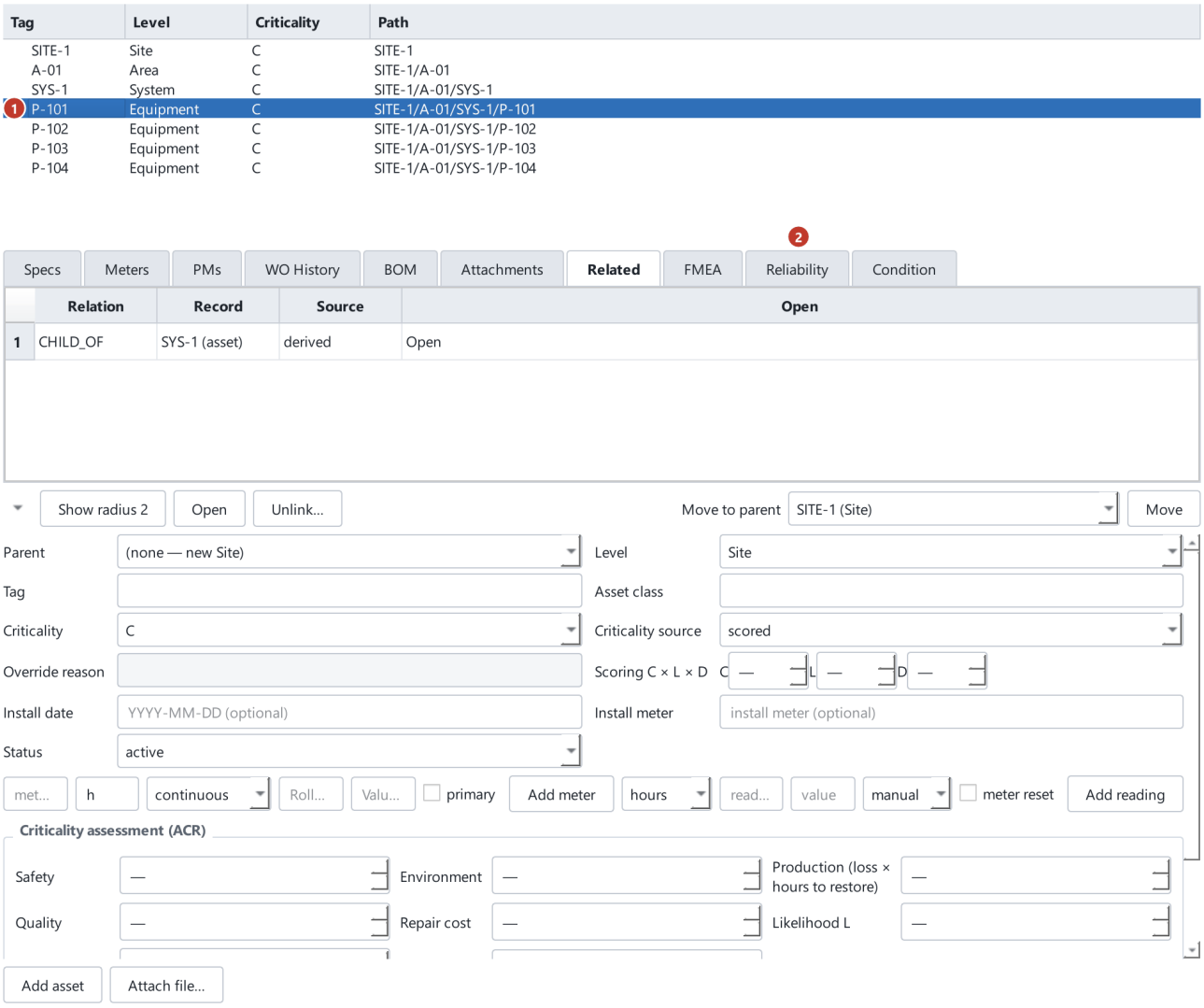
1. **Choose CMMS ▸ Assets…** in the menu bar. The first time in a session ReliaEn asks for the file in the box Open or create a CMMS file: choose your copy of reliability_plant.reliaen. The window with the asset tree opens.



Step 1 — the menu path

- ① CMMS: the menu.
- ② Assets…: the entry to click.

Steps 2 and 3 are marked ① and ② in the picture:



Steps 2 and 3 — P-101 and its Reliability tab

2. ① **Click P-101** in the asset tree.
3. ② **Click the Reliability tab.** ReliaEn shows P-101's record, card by card. Nothing is typed.

Part 4 — The record, card by card

1 Weibull 2P, MLE right-censored, 95%

Fitted model

2 β̂ — shape	2.7226 [1.4472, 5.1217]
3 η̂ — scale (h)	3217.7004 [2364.1065, 4379.4963]
4 6 failures · 1 suspension	
5 MTTF (h)	2862.2706
6 B10 life (h)	1407.9062
7 Refit 2026-09-26 07:00 (on demand)	

The method line and the card Fitted model

- ① The method line above the cards: Weibull 2P, MLE right-censored, 95%. The two-parameter Weibull fitted by maximum likelihood, the running time since the last failure counted as a survivor, with 95% bounds.
- ② β̂ — shape 2.7226 [1.4472, 5.1217]. The shape is 2.7226; with 95% confidence it lies between 1.4472 and 5.1217. The whole interval lies above 1: the pump wears out.
- ③ η̂ — scale (h) 3217.7004 [2364.1065, 4379.4963]. The characteristic life: by 3,217.7004 running hours about two pumps in three have failed.
- ④ 6 failures · 1 suspension. The six coded failures, and the 800.0 hours run since the last one, counted as one survivor.
- ⑤ MTTF (h) 2862.2706. The mean running time to a failure on the fitted model.
- ⑥ B10 life (h) 1407.9062. One pump in ten has failed by 1,407.9062 running hours.
- ⑦ Refit 2026-09-26 07:00 (on demand). When the record was fitted, and why: on demand, when the tab was first opened on the asset.

History

1 MTBF (h)	2975.00 (from 6 failures)
2 MTTR (h)	5.50 (from 6 repairs)
3 Age since install (h)	17850.0
4 Running since last failure (h)	800.0
5 First failure 2024-11-01 · last failure 2026-08-23	

The card History

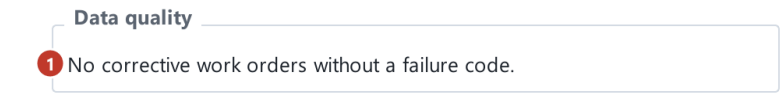
- ① MTBF (h) 2975.00 (from 6 failures). The 17,050 hours to the last failure plus the 800.0 hours since, divided by the six failures.
- ② MTTR (h) 5.50 (from 6 repairs). The mean downtime of the six repairs: 4, 6, 5, 8, 3 and 7 hours.
- ③ Age since install (h) 17850.0. The hours since the install date 2024-09-12.
- ④ Running since last failure (h) 800.0. The hours run since the failure of 2026-08-23.
- ⑤ First failure 2024-11-01 · last failure 2026-08-23. The span of the history the fit used.

Now

1 Hazard now (per h)	7.69522e-05 at 800.0 h · R 0.977642
2 RUL (median) 2045.779 h · not less than 1322.335 h at 95%	

The card Now

- ① Hazard now (per h) 7.69522e-05 at 800.0 h · R 0.977642. At 800.0 running hours the failure risk is 7.69522e-05 per hour, and the chance of reaching 800.0 hours without a failure is 0.977642.
- ② RUL (median) 2045.779 h · not less than 1322.335 h at 95%. The remaining useful life from now: 2,045.779 hours for half of such pumps, at least 1,322.335 hours at 95% confidence.



The card Data quality

- ① No corrective work orders without a failure code. Every repair of P-101 carries its failure code, so the fit sees all six failures.

Part 5 — How to interpret the results

Does the pump wear out? β̂ is 2.7226 and its lower bound 1.4472 is above 1: the failure risk of this pump grows with its running hours. With six failures the bounds are still wide (1.4472 to 5.1217), but the lower bound alone already rules out random failures - an age-based replacement can pay; read the PM interval card below the record before you set the overhaul interval.

Does the fit describe the history? The MTBF of 2,975.00 hours, from the pump's own history, is close to the MTTF of 2,862.2706 hours of the fit, as it should be when the fit describes the history. One pump in ten has failed by 1,407.9062 running hours (B10): the age at which an age-based replacement starts to make sense.

How much life is left? At 800.0 running hours since the last failure, half of such pumps would run another 2,045.779 hours without failing, and at 95% confidence at least 1,322.335 hours. Plan the next overhaul within 1,322.335 running hours if a breakdown before it is not acceptable. The Now card ages with the calendar: click Refit now before you read it on another day.

Is the record complete? The Data quality card has no uncoded work order, so all six failures and the six repairs behind the MTTR of 5.50 hours are in the record.