Even the best technicians get challenged

TWEDDLE™
— GROUP —

Why you should invest now in solid technical documentation foundations

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About Tweddle Group

Tweddle, part of CJK Group, helps the largest OEMs in automotive, agriculture and (heavy) machinery manage relevant documentation at the time of need. Originally, Tweddle started via technical writing services back in 1954 for the automotive groups in Detroit, like Ford Motor Company.

Today, Tweddle supports operators and technicians globally in their need for integrated documentation in increasingly complex and automated environments. Technicians are facing new challenges and need to maintain and repair their products even more quickly and efficiently.

Tweddle Group has moved into the digital product space with a vision to become a leading supplier of digital product information and diagnostic tools for OEMs worldwide. Our clients rely on our solutions to deliver the right content to their stakeholders at the time of need. Our solutions do not kill existing applications but embrace the fact that they are part of a bigger ecosystem.

Our portfolio holds information services like technical writing and translation, as well as services for the multi-delivery of this information via different channels. (Print and online). Besides services, Tweddle has complete solutions to solve technical maintenance or repair challenges.

A few highlights in our portfolio are our cloud-based, connected technical documentation platform for customers like Toyota Motor Europe, our Field Service capabilities for the Agriculture OEMs like Kubota, and our revolutionizing treeless diagnostic approach in production plants at the end of line, in the repair shop and on the field, ensuring finding the actual root cause of a problem as fast as possible.

The ability to deliver informative and appealing digital customer experiences across a range of touchpoints continues to grow in importance to organizations of all sizes across industries.

Tweddle acts as an information solutions company, working worldwide together with different Original Equipment Manufacturers. Our main goal is to simplify technical documentation challenges.

What is unique is our approach to already created information. We ensure to integrate it, optimize it where needed, and not necessarily rework everything from scratch. Tweddle also ensures the necessary quality for each programme, exemplified via certification standards like IATF16949, ISO14001 and ISO9001. Our consultive approach is very lean and pragmatic. We find the right solution to solve a particular problem.

A few main drivers are pushing us to the next level

So let us see why even our best technicians can get challenged. Technicians get challenged by the complexity of machinery. This due to the limited resource availability of skilled people as well as the expectation that everything should be fixed right from the first time.

About the Increasing complexity of machinery

There is an increasing growth in the complexity of machinery. This growth through innovative technologies makes machines more automated and more personalized than ever before. With this complexity grows the need to understand how to operate and service these machines.

Machines also become increasingly personalized, with specific and unique features per individual machine. The documentation should follow this individualization wherever possible.

Let us zoom in on the increasing complexity of the machinery, think of the impact on the technical documentation related to various aspects like

- Automation principles like autonomous behaviour

  o It was already quite a task to achieve a simple human machine interaction and interface with simple tasks on traditional machinery
  o An automated machine (autonomous, advanced feature sets) does not mean no maintenance needs anymore.
  o With highly automated machinery, there sometimes is another level of complexity involved (driven by innovative technologies)
  o It is crucial having an optimal human-machine interaction to optimally benefit from the value-add from the knowledge within your expert staff.

- New Technologies like electrification, hybrid technologies

  o Not everyone is at the same level, so new and adapted training needs to be an essential part of your documentation.
  o Think of technical documentation as a guidance for competence in your organisation
  o New opportunities for solutions via Machine Translation (MT) or Artificial Intelligence (AI)

- Product Sharing via mobility platforms or shared components

  o There are new ways of exchanging technical information between one or more OEMs, based on shared product components, platforms, or common go to market initiatives.
  o How do you make consistent technical documentation available if your knowledge and expertise comes from various places, even other companies, meaning that of the competence sits outside.

- Personalization to the smallest topic or unit of information

  o Each machine can be different and have individual sets of unique features. Technical documentation should be adapted, there is no 'one size fits all approach for manuals' anymore.

<u>About the shortage of technicians</u>

There is a shortage of so-called 'highly skilled technicians' on the market. As such, the need to share knowledge between new hires and experienced people grows. Often what is already known by people in the organization is poorly or even never integrated.

Let us zoom on the shortage of technicians, think of the impact on the documentation related to:

- Market shortage means hiring new technicians

    o An innovative approach to building competence fast via onboarding technical information

- Knowledge sharing

    o Innovative technologies should be taught to all staff
    o Sharing best practices

- Less subject matter experts

    o Expert people are put under pressure
    o The importance of peer review

<u>About Fix-Right-First time performance KPIs</u>

There is the expectation that production needs to keep always running, and if problems occur, they are easy to fix. Finding and understanding the root cause is essential in guiding technicians with relevant instructions.

Let us zoom in on the Fix-Right-First time performance, think of the impact on the documentation related to:

- Cause analysis

    o Is there aid in finding the root cause?

- Prescriptive maintenance information

    o What if preventive maintenance fails?
    o What if your technicians need assistance, is there any relevant information at hand?
    o Is there expertise and peer review information available?

- Troubleshooting

    o What if things go wrong? Trust us, things still go wrong
    o How is troubleshooting supported? Any guidance?
    o What about similar types of troubles that happened before? Do we see similarities and are we comparing data and information?
    o It is not because something is in the manual that we are aware of each failure, the conditions and the comparable circumstances, and the way we tackled the problem.
    o Support knowledge base solution, comparable service reporting or even best practise sharing can be made available

Make documentation available in a way users understand

So, there are different reasons why you should make technical documentation available in a way users understand. Our aim is to create one frustration-free information flow. An end-to-end process, with sometimes different steps. It can start with engineering data when the product still needs to be made in production. This can be until the dismantling information for repurposing. In between all those phases, there is technical documentation available to support the product in understanding, maintaining, and repairing it.

The information flow can have different file formats, needs transformation efforts to be published to the right channel for the right purpose at the time of need.

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Feedback during the lifecycle of the products ideally flows back to improve the technical documentation. We like to look at the information flow as a dynamic living ecosystem for technical documentation.

But why can it be so hard to make it available in an easy manner?

- Knowledge can come in all sorts, and files can have different file formats. It is not just about making another simple content directory available.
- Different systems exist, but often siloed, and there is no to minimal reuse of the same data.
- Stakeholders only need specific bits and pieces of the information for their purpose, when it becomes relevant to them, at their time of need.
- The substantial number of languages people speak is not fully supported, making documentation available in more languages requires a specific application. Although translation often is seen as a cost driver only, it also has advantages, and we try to make it an important differentiator. Your technicians supported in their own language often are effective.
- Capturing field knowledge in a consistent manner (unstructured information should be an integral part of the documentation flow).
- The presentation for the technicians (user interface) uses data or information from a legacy application and it is hard to use (not user-friendly, not adapted to screen size or conditions for the technician, not offline capable).

The information architecture basics exist of stakeholders, content, context

By identifying your stakeholders, their needs and the available content organizations can start working on a more solid approach to technical documentation which is more integrated, and which is adapted for the right purpose of usage.

So before realizing this, ask questions to justify and further clarify the case:

- Who are all involved stakeholders? Internal and external?
- How do we reach each stakeholder today? Via which channels?
- What types of information do we have? And what do we ideally need?
- How is the current information structured?
- Do we provide documentation in the same language as our end-users?
- Do we consider field knowledge?

The bigger picture in technical documentation solutions

The elements that are effective

- Flexible, topic-based information
- Multi-delivery capabilities
- Offline capabilities
- Translation service integration (Human and Machine)
- Feedback and integration from the field, making sure unknown information becomes known and does not stay unknown
- Innovative technologies like AI used in a pragmatic manner
- The level of service and support

An E2E process for a frustration free information flow

- Tweddle always looks at the bigger picture of your information flow, also if we just need to deliver a small bit.
- It is important to know what the different dependencies are related to technical documentation, to always guarantee the necessary quality.

Keeping an eye on the central repository principles for RMI (Repair and Maintenance Information) (repair and maintenance information)

- Ideally, all repair and maintenance information are stored in a central, cloud-based repository
- Often it is not an ideal situation. By connecting the dots (breaking siloed thinking), via aggregating or integrating services (API's a.o.) we ensure a landscape which is connected
- A flexible interface for the repairer, independent of where the information is coming from

<u>Revolutionizing with Tree>D (Treeless) Diagnosis Concept</u>

With tree>D, we take troubleshooting a step further. With tree<D, we identify the root cause of an issue with a product.
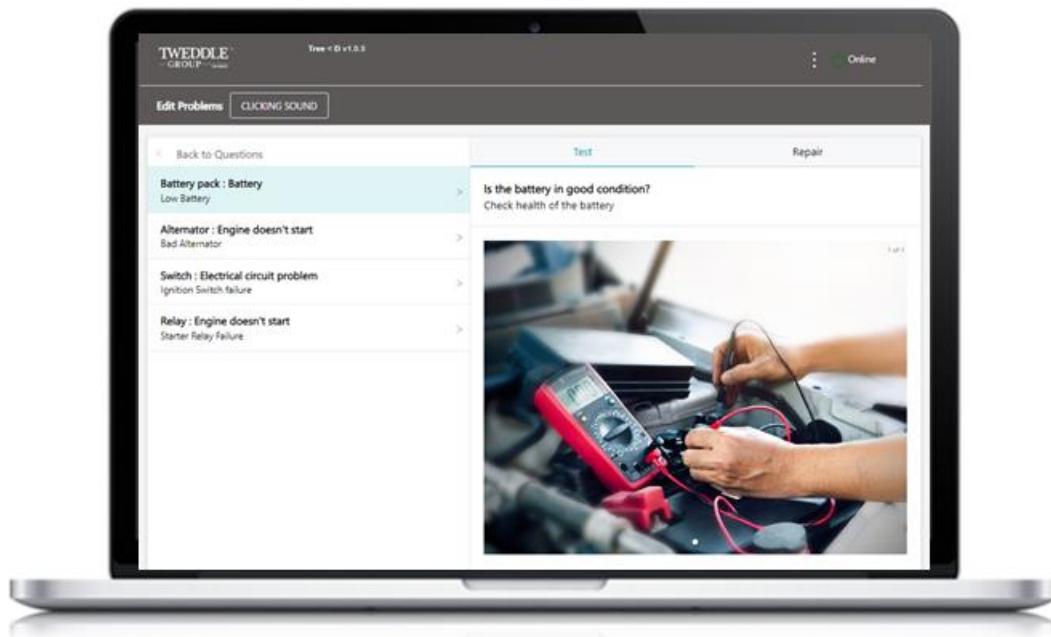
The fastest way to an answer with Tree< Diagnosis

Tree<D is a solution which was built based on a real need and addressed from our experience with field technicians. Tree> D is an application that helps you identify the root cause of a problem faster than ever before.

In traditional diagnosis, there are different tree structures involved, each with their own step by step scenario in search for the problem. If the scenario was not foreseen in the tree, you potentially were lost. This was often solved by another tree, but often it was like riding in the dark.

With tree< D, we simply throw this method away and use a whole innovative approach to diagnose problems for technicians.

We rank causes by probability, the root cause first. We eliminate other possible causes via questions or allow technicians to perform tests; so, we potentially know if it is causing (part of) the problem.

Once the root cause is found, we can provide technicians with the relevant repair instructions to solve the problem and give him easy access to all repair and maintenance information we have available for this. (Note the importance of the availability of centralized technical documentation)

Via logging the different diagnose sessions, we further improve the solution. Especially when multiple problems happen at once, and this is often the case, the solution has proven to be particularly useful.

The ability to guide technicians fast to the most possible root cause as fast as possible, is in the context of our challenged technician, simply a blessing.

How it works

The system starts with entering one or multiple problems. Problems can be a specific fault code, the description of the problem, a symptom, or a combination of them. Problems can be linked to multiple possible causes, based on earlier experience, or expected outcome.

To rank the possible causes of a problem, weights are configured via different parameters in the application. For example, the commonality of a root cause.

The data complexity of the combinations asked for an AI component that could deal with all these variations.
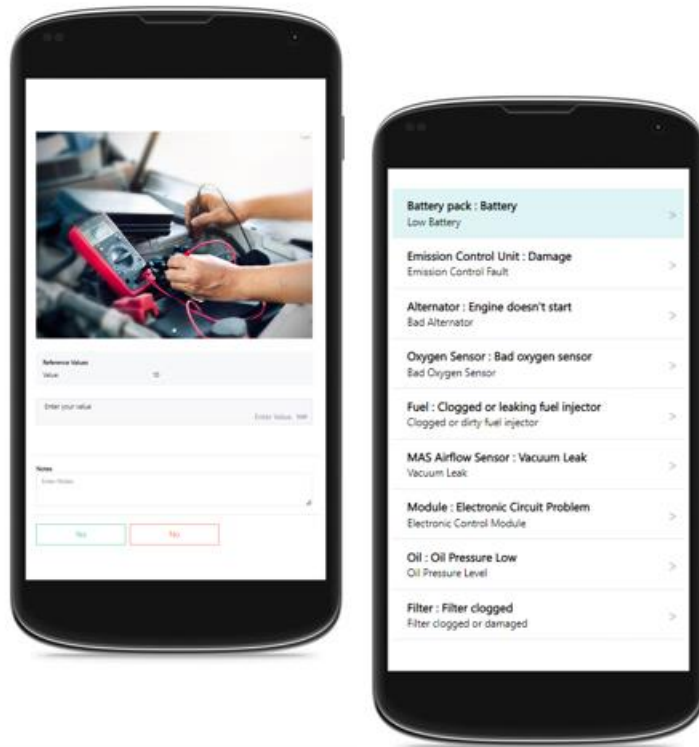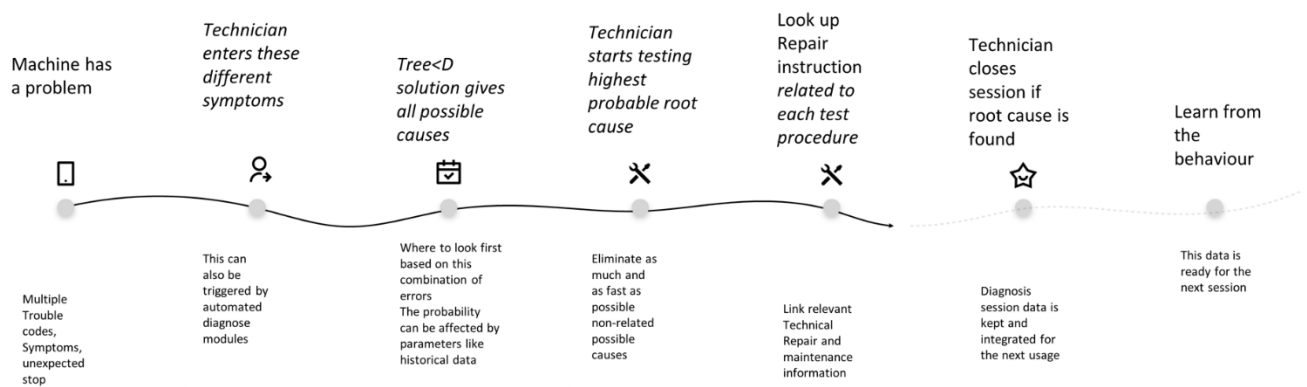
Key features

- Start from input based on DTC (Diagnostic Trouble Code), error or symptom
- Diagnostic data and session summaries
- Reasoning engine for the weights (ranking possible causes)
- Related problems
- Tests
- Questions
- Offline capabilities
- Multilingual
- Browser based (No software installation)
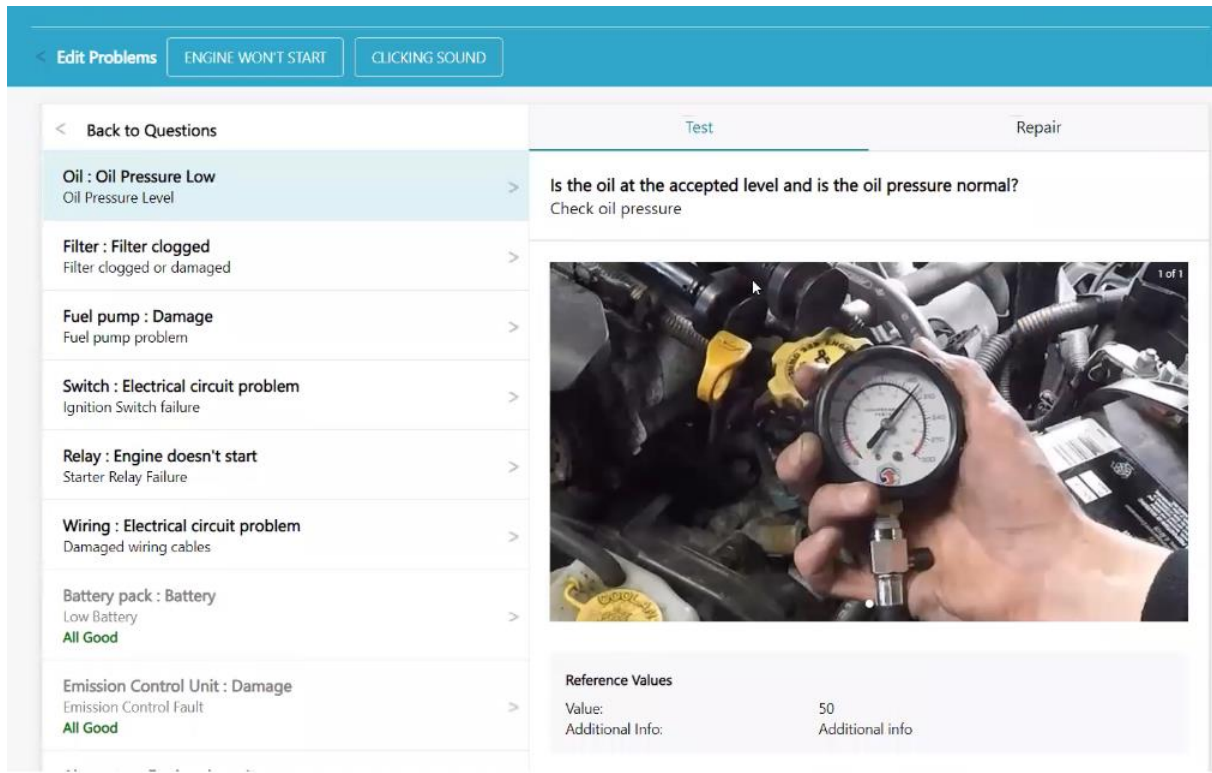- Report troubles

The proven benefits so far

- On simple to handle problems, treeless diagnostics gains 50% time on each case

- On more complex combinations of problems, that usually can take 30-45 minutes, treeless diagnostics only requires 5 to 10 minutes

The process (visual)

Machine has a problem

Technician enters these different symptoms

Tree<D solution gives all possible causes

Technician starts testing highest probable root cause

Look up Repair instruction *related to each test procedure*

Technician closes session if root cause is found

Learn from the behaviour

Multiple Trouble codes, Symptoms, unexpected stop

This can also be triggered by automated diagnose modules

Where to look first based on this combination of errors
The probability can be affected by parameters like historical data

Eliminate as much and as fast as possible non-related possible causes

Link relevant Technical Repair and maintenance information

Diagnosis session data is kept and integrated for the next usage

This data is ready for the next session

What's next? Contact us for a demo? contact rdeclercq@tweddle.com

How our services are structured

1. Map - Before you begin

Efficient documentation management starts with available data. Our experienced information architects map, assess and structure your existing documentation. You will get a clear view of what you have, how good it is and what is needed.

Related Services

information scan/Proof of Concept/Feasibility study/Information Architecture

2. Develop – The missing link

Are you missing critical information? Our cross-functional team of technical writers, linguists and document management specialists know how to develop and present documentation that is easy to understand. Correct and tailored answers for distinct types of users.

Related Services

technical writing/training instructions/translation services/printing services/interactive manuals

3. Connect – Connecting the dots

An unstructured library of documentation makes no one happy. What you need is the right information at the right time. On-demand documentation in a user-friendly format. Regardless of your background or specialization.

Our portfolio further explained (link to the cases online)
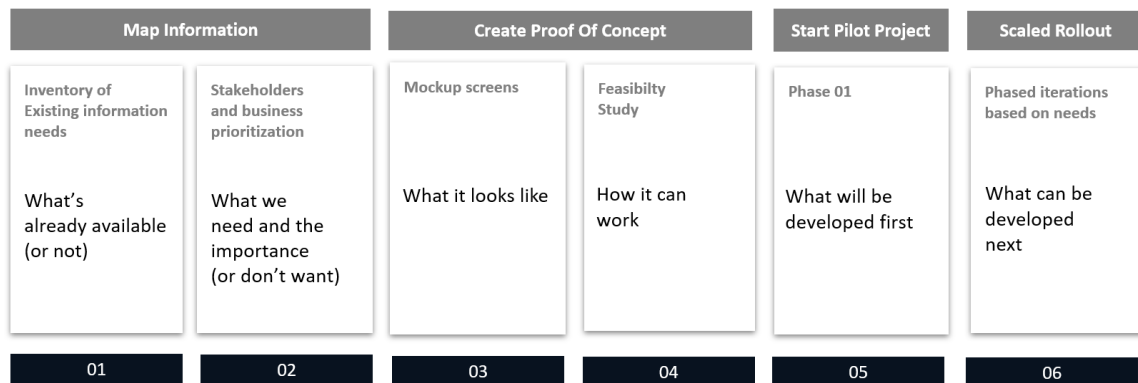**https://tweddleeurope.com/portfolio/**

Tweddle can rely on different solutions and is able to demonstrate and zoom in on them. Hereby a brief list of solutions, and what they do.

- Centralized technical documentation made available at the fingertips of technicians
- Unstructured field service report data made available throughout the whole organization
- Diagnostic solutions for troubleshooting (Tree<D/Tracer)
- Translation as a service
- Optimal channel delivery via Print on Demand
- Multi-Commerce solution (shop in shop principle)
- Content delivery
- Knowledge based
- IoT maintenance
- Parts Catalogue
- Flexible CCMS

How we typically work (phased approach – see scheme)

In short, on how we work. Looking at what you have, we identify your expectations, prioritize them, and validate them before building. A proof of concept on how it can look, a feasibility study on how it can work, and finally, a roadmap that you can afford.

Map Information		Create Proof Of Concept		Start Pilot Project	Scaled Rollout
Inventory of Existing information needs	Stakeholders and business prioritization	Mockup screens	Feasibilty Study	Phase 01	Phased iterations based on needs
What's already available (or not)	What we need and the importance (or don't want)	What it looks like	How it can work	What will be developed first	What can be developed next
01	02	03	04	05	06

MAP INFORMATION

- Phase 1 inventory of existing information needs
- Phase 2 stakeholders and business prioritization

CREATE PROOF OF CONCEPT

- Phase 3 mockup screens
- Phase 4 feasibility study

START PILOT PROJECT

- Phase 5 what needs to be developed first

SCALED ROLLOUT

- Phase 6 phased iterations based on the needs

Contact Information

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