

ZWP Anlagenrevision is a subsidiary of the TÜV Saarland. As an accredited testing laboratory we have been active in the field of non-destructive materials testing for over 30 years.

In addition to ZWP's well-known methods, our expertise lies in the field of non-destructive testing of concealed corrosion in lamp-posts and pipeline systems using electro-magnetic ultrasound (EMUS).

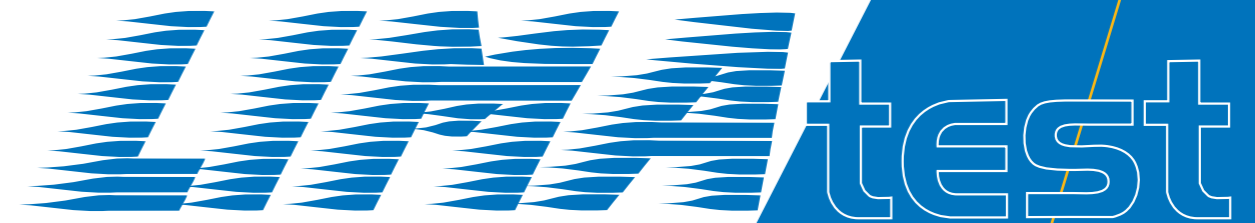


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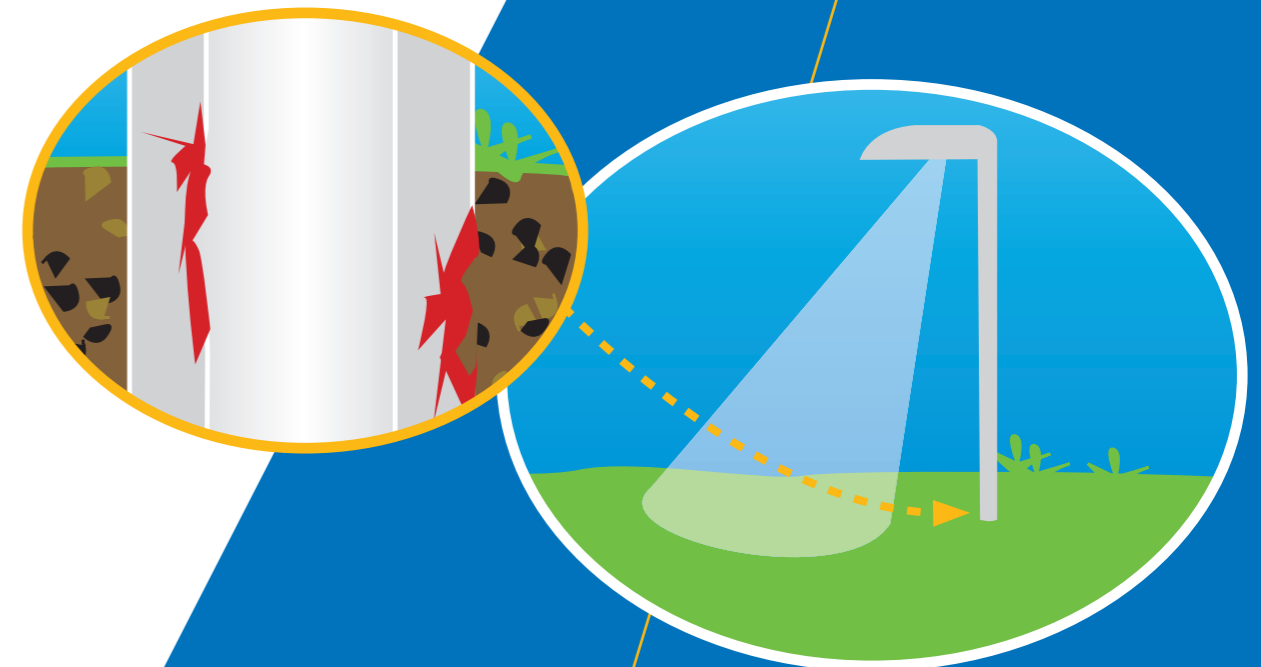
Mast systems, like lamp-posts, traffic light posts and anchor masts, can cause considerable damage to people or property if they topple over. Operators are responsible for their constructional stability as part of their obligations to traffic safety.

The inspection is with regard to rusting through of masts, particularly in areas that cannot be identified by the naked eye. LIMAtest® was developed as a solution for precisely this problem, in conjunction with the Fraunhofer Institut for non-destructive testing and the University for Applied Sciences in Saarbrücken. With this method it is possible to locate corroded areas and hence to assess the structural stability.



*This brochure was given to you by:*

*How safe are lamp-posts?*



Material and geometry such as the height, weight and form of the bracket arm as well as the site are to a large extent what determine the stability of the system.

A new mast involves little risk, as it is manufactured on the basis of relevant static calculations and is erected in accordance with its intended purpose. Its material properties conform to the applicable regulations. However as masts are designed for use over a prolonged period of time and all materials are prone to corrosion, the area at risk shifts to the section of the post that is exposed to the most concentrated attack from corrosion. Analyses conducted over many years have demonstrated that this is where the post is set in the ground. Road salt, precipitation, surface leakage currents, aggressive soil conditions such as dog urine and continuous moisture can wreak destruction in the long term. This means the area at risk extends from the window opening to where the mast enters the ground.

## This is how it works.

## Inspection

### 1. First all the main data concerning the mast are recorded:

- mast circumference
- height of the mast door to the point where the mast enters the ground
- measurement of the height of the light spot using laser
- recording of labelling and any damage to the mast such as dents, holes, cracks...

### 2. An ultrasound inspection head is guided around the post.

In so doing it induces an ultrasound wave in the pipe wall by transmitting a magnetic and electric alternating field that is propagated as an impulse in one direction along the post, to include the section that is embedded in the ground, and penetrates the entire thickness of the wall. If there is any degradation due to corrosion along the inspection path a part of the ultrasound energy is reflected back to the inspection head and is recorded as a 2D echo signal.

### 3. Analysis

The computer used to perform the analysis is located in a vehicle in the immediate vicinity of the mast. This computer processes all the data and signals, analyses them and presents the result in the form of a scan. The intensity of the degradation of the wall is colour coded. The inspector thus obtains an initial impression of the mast's condition within a few minutes.

## Results

### 4. Using bespoke software, the EDUSTA expert system, the stability of the tested mast is assessed and the remaining potential service life is calculated.

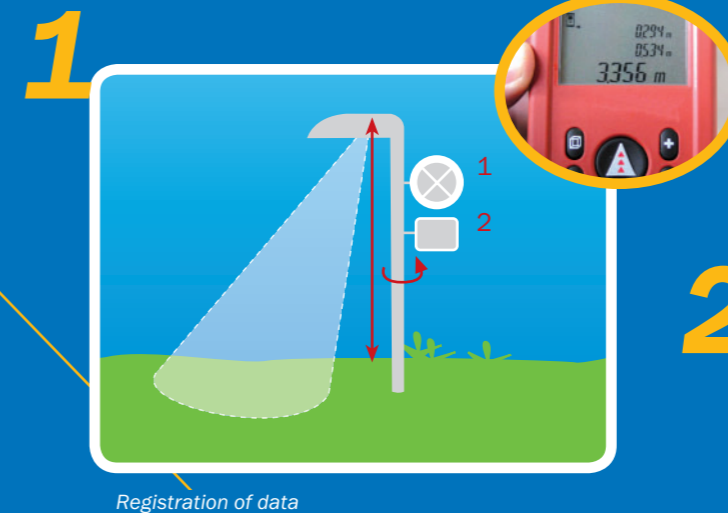
This static calculation is based on the applicable standards in each case and varies depending on the type of mast. Any data recorded previously, and also figures such as geometric dimensions, material, type of bracket arm, age, location, wind zone, buckling, bending, lateral tensional buckling, static and dynamic torsion effects, and calculations of strength and analysis of notch effects are recorded and analysed. As a result of this it is possible to determine the remaining service life extremely accurately by taking the environmental conditions into consideration.

Details on the remaining service life, suggested repeat inspection and the overall condition are stored and compiled in a full test report with a digital image of the post. Here it is possible to choose the format for documentation that matches customer requirements (standard MS Office formats etc.).

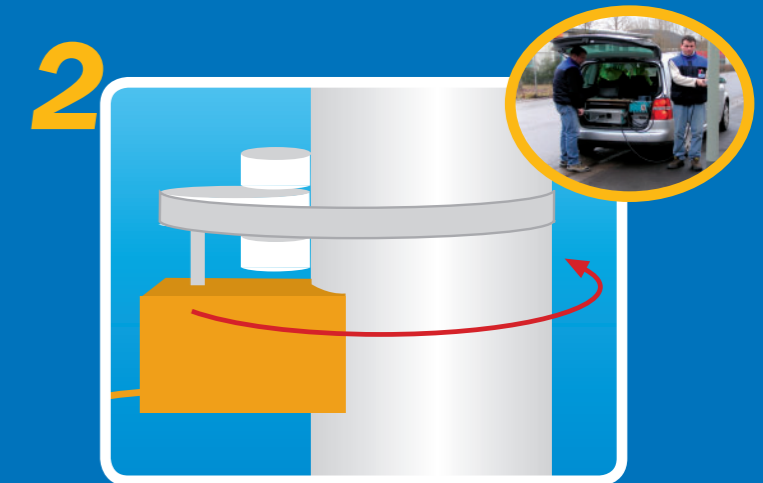
In contrast to the common practice of conducting visual examinations or tapping tests or carrying out replacements as a precautionary measure, substantial expense is saved while at the same time increasing safety noticeably in spite of the costs for inspection. This makes it possible for municipalities, cities and other authorities responsible for maintaining traffic safety to keep the potential risk from collapsing posts to a minimum with low financial outlay and without investing a great deal of time.

## Benefits

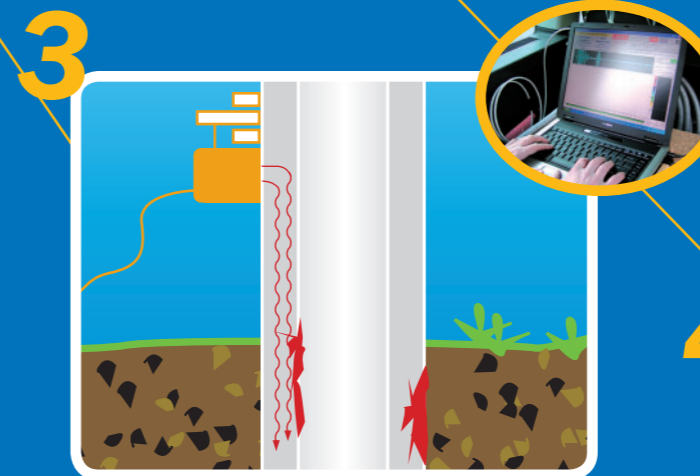
LIMAtest® operates non-destructively, without any detrimental effect on the foundations, without any interference to road traffic, without any adverse effect on the post or its environment at all or even damaging it. Thanks to the use of the electro-magnetic inspection heads the inspection can be conducted in a "dry" state, i.e. without special preparatory work on the pipe surface and without need for a coupling medium.



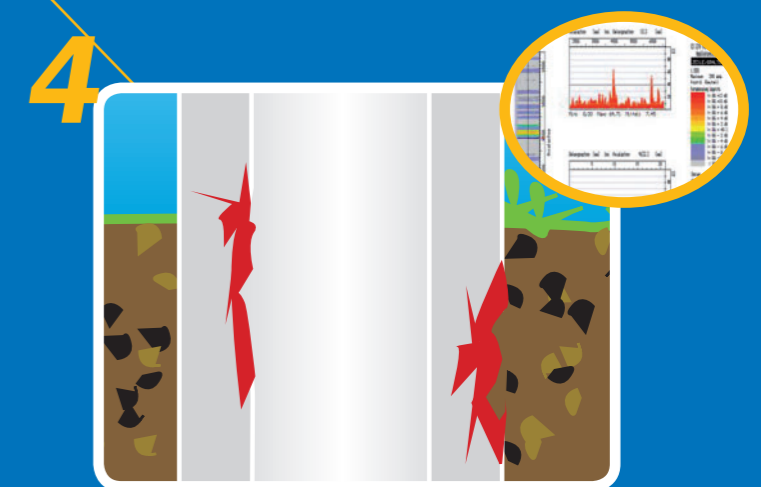
Registration of data



Ultrasound head is attached



Ultrasound penetrates the mast, data are analysed on the computer



Result