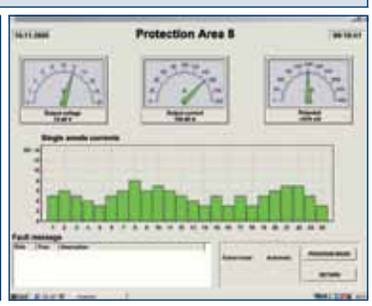
Specialist services

Regular monitoring and routine maintenance

GCP has been providing this service to a large number of clients in Germany for many years. The company always has the greatest concern for the functionality of systems and installations under its regular surveillance and maintenance. We consider this as a reservoir of knowledge and experience. Long-term relationships with our customers are cemented by mutual trust and understanding. We also provide this service to a large number of international customers on an „as needed“ basis. We can provide surveillance teams to operate worldwide, for example on annual contracts. Regular monitoring and maintenance services can be finalised in accordance with our practical experience, requirements of system functionality and enduser specifications.

Remote monitoring and control service



In addition to skilled engineers and maintenance technicians, we can also provide remote monitoring and control services for new or existing CP systems. We can design, install and maintain the highest quality systems using traditional or wireless communication systems. CORROCONTROL allows remote control and monitoring of CP system performance and functions for unattended CP stations meaning that only periodic on-site maintenance is required.

Intensive survey

Detailed intensive survey can pinpoint faults and limitations which are not always revealed by routine system monitoring surveys.

Stray current investigation

The effects of stray currents from DC sytems (railways, tramways, mines, HVDC transmission, cathodic protection, etc.) are so well known that investigation and implementation of remedial measures is an integral part of CP projects. However, some CP systems may face unique problems which require more detailed and sophisticated investigation.
In most cases, it is not until some damage has already been caused that analysis is made of the effects of stray currents and the remedial measures needed to solve the problem.
We can also provide risk assessment and mitigation planning for proposed new CP systems so that any necessary remedial measures can be implemented in advance. This helps avoid delays which often arise when interfering systems are being operated by different owners.

Pearson survey

Using the method first introduced by Mr. J. M. Pearson, we can provide the skilled personnel and specialised equipment needed to carry out this survey which determines:

- location and depth of underground metallic pipelines, structures, cables, etc.
- location of defects in corrosion protective coating (so-called holidays)
- location of electrical contact between the injected test signal and nearby pipelines, etc.

Pearson survey was used extensively in the past. Although we can still offer such services, we recommend instead the use of a computerised Close Interval Potential Survey (CIPS) to determine the location and extend of defects in protective coatings and to assess any possible effects those may have on the functionality of cathodic protection systems for underground pipelines.

Fault location

Cathodic protection systems may have faults which only become apparent after system implementation. Such faults can substantially reduce the efficiency of a CP system. They may be caused by faulty insulating joints, contact with other metallic structures such as foreign pipelines, cables, sheet piling, reinforced concrete structures, casings, etc., or they may be the result of the presence of other insulating valves and expansion joints. It is not always easy to determine the location of such faults. However, our experienced personnel can offer a range of tried-and-tested methods to locate and eradicate such problems quickly and effectively.

Specialist services

Survey of subsea pipelines

We can provide services for the external survey of subsea pipelines in partnership with experienced, specialist marine survey companies. We are responsible for all matters concerning cathodic protection and the marine survey company determines the exact location and route of pipeline. Surveys use satellite positioning system and marine survey equipment such as echo sounders and side scan sonar to provide seabed data and sub-bottom profilers, related equipment to determine pipeline location and depth, towed and/or remote cotrolled vehicles for exact positioning of reference electrodes, as well as computers for on-line recording and processing of data.
All such survey projects can be carried out according to specific enduser specifications and requirements.

Close Interval Potential Survey (CIPS)

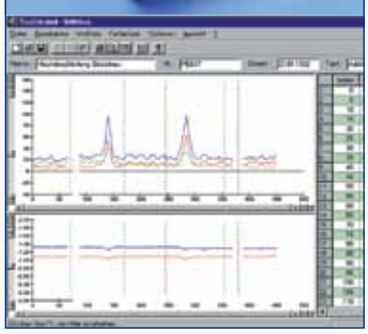
Analysis of the external corrosion of buried pipelines is made using pipe-to-soil potential measurements. Pipe-to-soil potentials are usually measured at fixed test points spaced between 1-5 km along a pipeline. However, since such measurements are only valid at the location of the reference electrodes, there is a lack of reliable information about the CP status elsewhere along the pipeline.
Considerable deviation in soil resistivity, interference and other factors can cause corrosion at intermediate locations even though the test points indicate favourable data. If the distance between the test points is decreased, the survey will provide more accurate data about CP conditions along the pipeline. This is why the Close Interval Potential Survey (CIPS) is developed, allowing intensive potential measurements to be taken at intervals of 5 metres or less.

Reasons to use Close Interval Potential Survey (CIPS)

It is obvious that a manual survey of pipe-to-soil potentials at such close intervals can be neither practical nor economical, especially if a long distance transmission pipeline is to be inspected. Even if stripchart recorders are available, such a survey woud be extremely time consuming. Thus a faster and more reliable method is a better alternative.
CIPS overcomes such problems by automatically recording, storing, calculating and displaying measurement data, which can be presented in tables or graphics.
The MoData2 Multifunction Instrument is used for field recording and display of pipe-to-soil potentials and voltage drops in a cathodic protection system. These are also stored in the MoData2`s internal memory.

Our mobile software package integrates/offers 4 measuring methods:

- **2-electrode method**
- **3-electrode method**
- **Addition method**
- **IFO method**



Further technical details can be found in:

Chapter 12, Document-No.: 12-310-R0

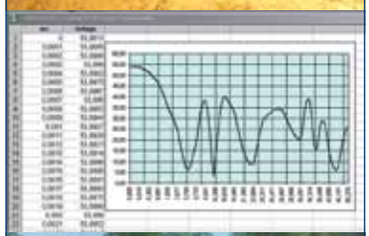
Specialist services

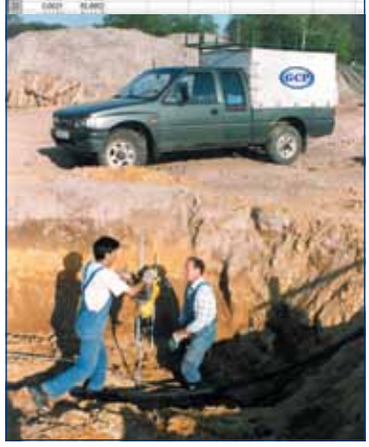
Computer based calculation of AC induced high voltage

Effect of alternating current is a matter of serious concern for safety of pipeline, connected equipment and operating personnel. This problem has become more serious now than what it was in the past due to rapid increase in the number and voltage levels of AC transmission lines in the right of way of underground pipelines and improvement in the quality of pipeline coating.
Maximum permissible safe voltage up to which personnel and equipment may be exposed under various conditions are defined in safety codes and standards. It is obligatory for the owners to maintain voltage levels within safe limits. With increasing awareness of the public with regards to human and environmental safety, it is necessary to give due weightage to problems of AC interfered pipelines.
The magnitude of AC induced voltages can be measured in existing pipelines. But it is generally impossible to determine correct remedial measures to control the magnitude of permanently induced voltages. It is also impossible to determine the magnitude of voltages which would be induced when a pipeline is laid in the right of way of AC transmission lines. Because of these practical considerations, the company has developed a computer software and procedure to investigate and provide correct remedial measures for the safety of pipeline, connected equipment and operating personnel.

Our scope of services includes:

- collection of design and field data
- calculation of AC induced profiles along the pipeline
- calculation of AC voltage
- design of required earthing measures
- supply, installation and testing of recommended remidial devices
- field measurement of induced AC voltages
- preparation of reports

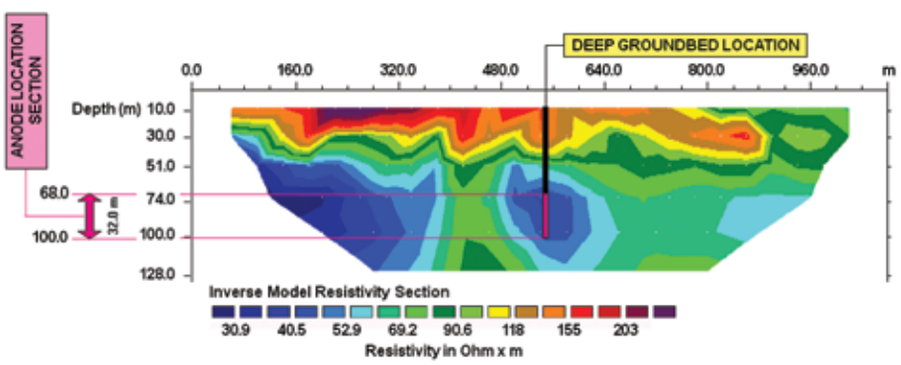




Computerised geophysical soil survey

A very important part of our company`s projects is the determination of electrical soil resistivity to assess the corosiveness of soil and its effects on the working performance of groundbeds, especially on deep groundbed protection systems.
We carry out soil resistivity measurement surveys for cathodic protection systems and power distribution line projects and provide trained personnel with all equipment and accessories necessary to carry out such surveys in accordance with enduser requirements.
This measuring equipment has been developed and used successfully in the investigation of specific soil resistivity. Most of the commercially available earthing meters fail to provide correct measurements for soil resistivity at depths of more than 30 metres. Correct data on soil resistivity at greater depths is of special importance for the correct designing of deep anode groundbeds.
We use state-of-the-art portable soil resistivity meters which store readings conducted at user defined measurement cycles. This provides the highest accuracy and lowest noise levels in the industry.

The specialised survey for the determination of electrical resistivity and geographical profiling of the test area uses computerised measurements with test electrodes and custom made software for data processing and presentation of results.



Specialist services

Data management software

All GCP software packages are designed to enduser specific requirements and CP system structures. They substantially reduce the amount of paperwork and the cost for record storage management.
The data management system software allows users to import all relevant data and records either from hand-held dataloggers via interface or from computer network data files.
The data storage structure has been carefully refined and improved using years of experience in storing millions of records of site data.
Users can navigate through the various tasks of pipe sections, tank farms, pumping stations, etc. to view the required data.

They can create printed reports, save the data on a disk or into other applications, such as Excel™.
The software is fully compatible with all Microsoft™ applications and requires minimal training.

Training and qualification seminars

Depending upon enduser specific requirements, we can provide seminars for the training and qualification of personnel.

Our range of services includes:

- **management / executive appraisal programmes**
- **CP design and engineering courses for pipeline and plant engineers**
- **corrosion and cathodic protection basics**
- **system monitoring and maintenance**
- **CIPS, Pearson and other surveys**
- **office and field application of computers**

The training can be arranged at GCP offices, enduser offices or on-site depending upon enduser requirements and number of participants.
The program content is finalised in consultation with the client and includes tests, appraisals, assignments and field work for performance evalution.