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Partnerships in Cement

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Concrete Design & Testing System (CDTS)

A Concrete Quality Data Repository

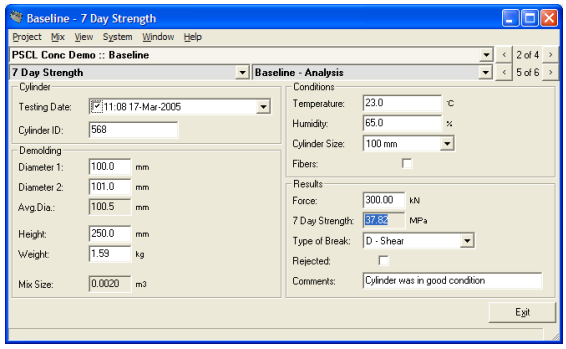
As concrete producers strive to improve the quality of their services and products, the need arises to implement and maintain a data management system that does more than just hold test results. Such systems must be easy to use for accurate and timely data entry, and provide efficient data organization for retrieval of data. The Concrete Design & Testing System (CDTS) is the data management tool tailored to your industry.

Concrete LIMS

Laboratory Information Management Systems (LIMS) is a generic term for a software database product that stores analytical test results generated by a lab. Process Solutions offers 3 LIMS products for cement, waste fuels, and concrete laboratories. Although all three of these products have similar LIMS features we customize each LIMS product for a specific industry. We do not offer a single LIMS product that attempts to solve the data management problems from multiple industries.

CDTS has all the features that you would expect in a full featured LIMS.

- Field calculations allow for the system to be customized mimicking the worksheets already used in the lab.
- Data validation for the analysts is handled by checking new data against predefined ranges. Color coding and other mechanisms warn the analyst against possible data entry errors.
- Data validation for the lab manager is handled by a data review or publishing feature that allows the lab manager to easily review all data entered by the analysts.
- Interfaces to balances, compression machines, length comparators and other laboratory instruments allows for the option of speeding up the data entry process for the analysts and guarantees there are no errors in typing the results into the system.
- The secured database logs all transactions of a mix's test results. The audit log can display the analyst name associated to any test result. The reason why data is overwritten is also recorded along with the original value.
- A work list schedule reports when specimens need to be tested.
- Integration with Process Solutions LIMS modules, such as the Instrument Calibration & Maintenance System (ICMS), Analyst Certification module (ACS), and Automated Reporting.



CDTS Data Entry Screen

Project Management

The reasons why concrete analytical testing is done vary. Reasons can include customer compliants, an investigation on a specific concrete ingredient, or concrete performance of a supplier's concrete ingredient over time just to name a few. There always is a reason and the project management subsystem in CDTS tracks this.

The project management subsystem is customized to each installation. In some cases the project record in CDTS only stores a name, ID number and date. In other installations the project tracks cost and billing information, approval statuses, reporting requirements definition, project outlines, proposals and conclusions.

File attachments can be uploaded to the CDTS database and associated to projects. Any file type can be uploaded. The file may be supporting documentation preceding the project or project conclusion reports.

* PSCL Windows applications are tested with current versions of Windows at time of release; however, we do not guarantee full functional compatibility with all Windows versions.

Material Management

Although the primary purpose of CDTS is to store concrete test results, concrete is nothing without its ingredients. CDTS stores a full list of the materials available to make concrete from.

The materials are broken into 7 major categories: cement, supplimentary cementititious, course aggregate, fine aggregate, admixtures, fibers, and water. Materials are further identified by their product type, supplier/source of the materials, and the date it was produced or shipped.

With each shippment of material received in the lab, information from the material's test certificate can be entered into the system. Each material type may have different test results; e.g. cement would have a fineness index, aggregates would have a sieve analyses, and water may have pH. The material properties can be reported with the concrete performance properties once all testing is complete.

The material management subsystem also tracks inventory. The amount of material is recorded when it is received. This value is decremented each time that material is used in a concrete mix. The inventory is easily updatable should the real-world inventory differ from the value reported by the system.

Mix Designs

Concrete test results by themselves are meaningless unless they can be compared against a control mix. There should only be one difference between the ingredients used in the test concrete mix and the control mix. The difference may be as slight as the time of production of a single material. By knowing the only difference between two mixes in one parameter, that parameter's impact on concrete performance can be judged by comparing the test results of the two mixes.

An easy method of comparing two mixes is to create standardized mix designs. These designs are named and material product type ratios defined by the laboratory manager.

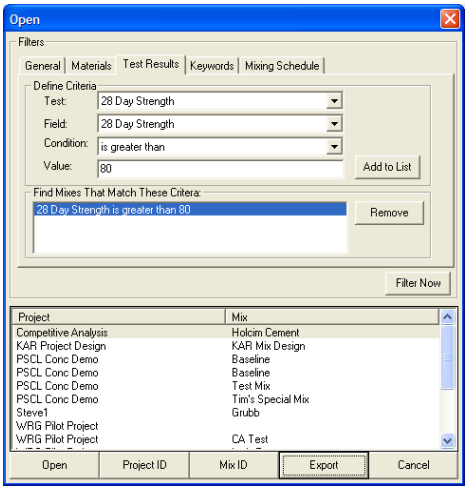
A specific concrete mix record can utilize a predefined mix design by simply selecting it from a list. Specific materials that match the generalized ingredient list of the predefined mix design can be substitituded at this time.

Aggregate materials can be batched prior to the acutal mixing of the concrete. The design of the mix is automatically adjusted according to new moisture or absorption retesting done on the aggregate.

Searching and Reporting

The strength of CDTS lies in building a data repository of concrete comparative data, regardless of whether it is identifying how materials have changed with respect to production time or comparing alternative mixing methods for a single set of ingredients available to a construction project.

A strong search engine exists in CDTS so that test results can be retrieved easily. The ability to find test results of similar projects in the past can reduce the amount of new analytical work required by the lab for a new project.



CDTS Search Dialog

The search dialog allows for searching on multiple parameters. The concrete mixes returned can be limited by the name of the predefined mix design name used. Some of the project property fields can be marked as searchable and added to this dialog. Results can be filtered to only concrete mixes using a material from a specific supplier over a given date range.

Also the test results can be searched against minimal concrete performance characteristics; i.e. the test results themselves are searchable.

Once the search dialog returns a list of matching concrete mixes, these can be opened within the CDTS application to view any detailed information regarding the mix or project. Alternatively data for all or some of the matching test results can be exported direct to Excel™ for further analysis.

Some standard Excel™ reports are delivered with CDTS for project results and a testing certificate for a single mix. The requirements of these reports can change with each client. Therefore they are not embedded within the CDTS application. The familiar tools of Microsoft® Excel™ allow end users to easily add their own analysis to the data and distribute it. These reports can always be locked with the protection offered by Excel or Adobe Acrobat (PDF).

There is one standard report that is embedded in CDTS. This report provides information on how material ingredients change over time. The concrete performance of mixes using a standard mix design and a given supplier's materials can be plotted against the production time. Information from the material certificates may also be added to the report. Although this is embedded in CDTS, the report results can be exported.

System Access and Security

Security of data, both short and long term, is becoming increasingly important. CDTS includes features to ensure that information is kept secure with the login validation and access levels. We have developed innovative, simple, and cost-effective ways to access the system. Replace the often-frustrating password method with an iButton, or continue to use the ID/password; CDTS offers that flexibility. An iButton speeds up system entry and exit for users; and decreases the likelihood of a user leaving a workstation open posing a security risk.

Communication with Other Systems

Because concrete testing uses materials from suppliers that can span a wide geographical area, data sharing is a common requirement of a CDTS installation. Entering test results from a material supplier's or independent lab's certificate can be time consuming and error prone. Therefore, automatic import of these data is a common feature.

This automatic import is usually done by negotiating a simple file based upload protocol with the LIMS provider for the material supplier. With this in place the material supplier can deliver a CDTS upload file with their material. Note that the most common LIMS vendor for cement manufactures in North America and Australia is Process Solutions' Laboratory Database Management System (LDMS).
In addition to importing material information, options exist to have CDTS import mix and plastic test information collected at construction sites. This is useful information for when the hardened specimens are brought to the concrete lab for testing.
Automated exporting of final concrete test results to centralized knowledge warehouses, financial systems or back to material suppliers is also possible.

System Requirements

Depending on your needs and company size, the system will operate on Microsoft® SQL Server or Oracle™. Depending on your requirements and network, the system can be installed on a centralized server or on a local near the concrete laboratory.

CDTS runs on Microsoft 32-bit Windows™ environments.* Computer systems should meet the minimum specification for these operating systems.

Customer Assurance and Support

Process Solutions has been providing concrete laboratory solutions since 1999 and our background in cement extends well beyond that. This is important as it means that we understand the needs, issues and working environment of the industry.

We work with you to design and/or customize your solution, and to install, implement and maintain the necessary hardware and software. This process typically includes on site time to survey the site and confirm requirements before detailed planning and implementation start.

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We offer a full 12-month warranty on all of our solutions, and provide customized ongoing maintenance and support agreements. Our Customer Care group carries out on-site installations, and provides full-time Help Desk support.

Most importantly, we aim to establish client partnerships for the long term. We develop on-going working relationships that will enable you to get the most from your existing solution(s), and at the same time help us to further develop our portfolio by understanding and satisfying your needs.

We are continually updating and improving our core technologies. Relying on user feedback makes our software better suited to the concrete and cement industry, and all of our software is tailored to your individual requirements.

Cost and Delivery

Our Customer Care team installs CDTS on site. The installation media is distributed on CD-ROM with electronic documentation. CDTS requires a single license for each site, but any number of users can access. Some user limitations may exist, however, for the Oracle™ or Microsoft SQL Server™ database user licenses. The price for this package includes configuration to specific site requirements, training, installation, and our standard maintenance and support agreement for the first year. The maintenance and support agreement can be extended annually at a cost of 12.5% of the original system's license cost.

Summary

CDTS offers both a traditional LIMS and a powerful data repository tool specifically designed for concrete quality testing. It provides many benefits, including simplistic data organization and easy data retrieval, by grouping mix samples into project records; as well as intuitive data entry of sample test results.

Any information about the effect of different quantities or materials can be researched in the data repository to answer client questions, resolve problems or to determine a more effective concrete mix.

If you would like to discuss with us this concrete quality data repository for your laboratory, please contact our Quality & Environmental Solutions Manager:

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