

## Advanced Publishing in NDT

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### Abstract

A large number of technical publications, especially journal articles or conference articles, are published every year. Thanks to the Internet this literature is now searchable; however, it is not easy to find desired information by use of unstructured search engines like Google etc. A better search can be done by use of structured databases which have been in use many years before the Internet was born. These databases are still available to purchase thus have difficulties to exist against the free Internet search engines. NDT.net is a database of NDT Literature and recognizes the need for free access to literature. Today many NDT conferences and NDT societies deliver their content to the NDT.net database to give the best service to their NDT community. As another benefit the conference host or the NDT Society can get a conference CD as a "hard copy" of the NDT.net database content. This paper describes the principles of the NDT.net database.

**Keywords:** Internet, publication, database

### The Internet Search

When searching a subject by using Google or similar Internet search engines, it is almost like gambling or gathering for a lucky hit. A search of "ultrasonic weld testing" demonstrates this result.

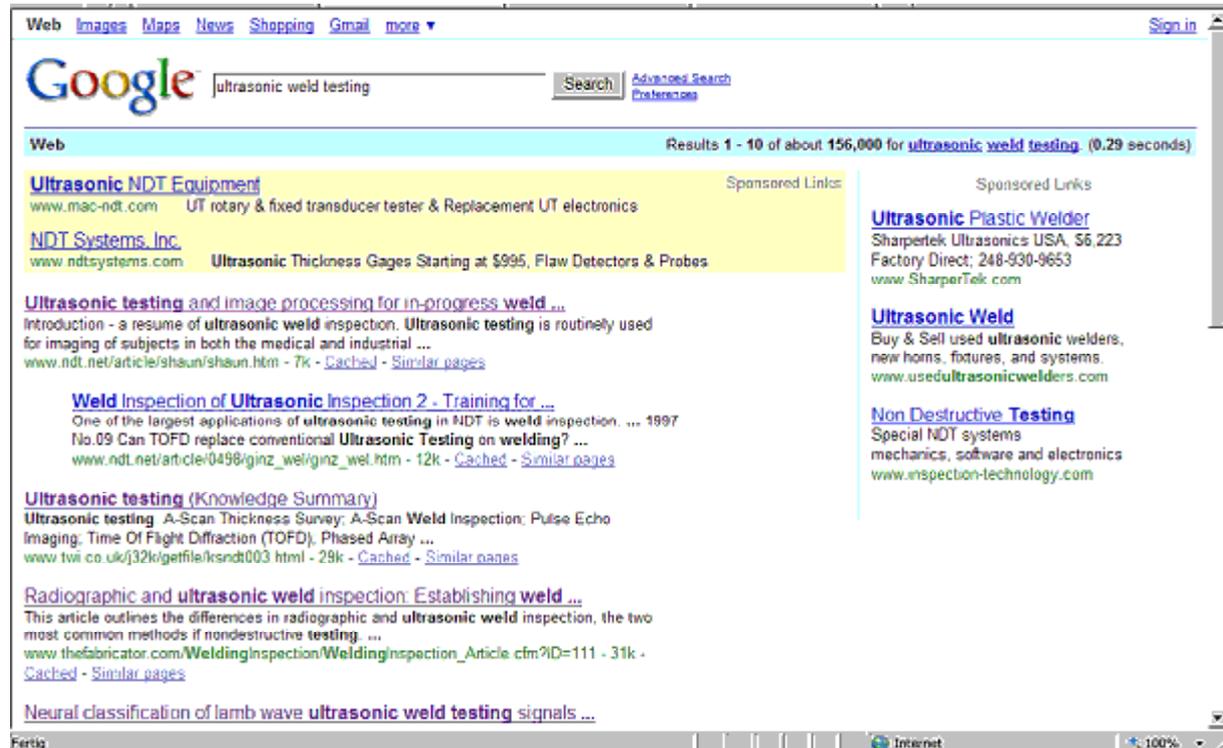


Fig.1 Example of an Internet search via Google

## Results 1 - 10 of about 1,160,000

1. Ultrasonic testing and image processing for in-progress weld ...  
[www.ndt.net/article/shaun/shaun.htm](http://www.ndt.net/article/shaun/shaun.htm)  
*This first item in the results list shows an article of NDT.net, in principle good, but why an article from 1996 and just this one which is not very strongly related to the search term?*
2. Weld Inspection of Ultrasonic Inspection 2 - Training for ...  
[www.ndt.net/article/0498/ginz\\_wel/ginz\\_wel.htm](http://www.ndt.net/article/0498/ginz_wel/ginz_wel.htm)  
*This NDT.net article ranking on item 2 meets the subject better.*
3. Ultrasonic testing (Knowledge Summary)  
[www.twi.co.uk/j32k/getFile/ksndt003.html](http://www.twi.co.uk/j32k/getFile/ksndt003.html)  
*A very general introduction without being specific in weld testing*
4. Radiographic and ultrasonic weld inspection: Establishing weld ...  
[www.thefabricator.com/WeldingInspection/WeldingInspection\\_Article.cfm?ID=111](http://www.thefabricator.com/WeldingInspection/WeldingInspection_Article.cfm?ID=111)  
*This one page article without any illustrations isn't very informative.*
5. Neural classification of lamb wave ultrasonic weld testing signals ...  
[ieeexplore.ieee.org/iel5/19/20126/00930439.pdf?arnumber=930439](http://ieeexplore.ieee.org/iel5/19/20126/00930439.pdf?arnumber=930439)  
*Just an abstract, we have to purchase the full-text article*
6. Welcome to IEEE Xplore 2.0: Neural classification of Lamb wave ...  
[ieeexplore.ieee.org/xpls/abs\\_all.jsp?arnumber=930439](http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=930439)  
*The same abstract as above.*
7. 341 Results for [ultrasonic]  
[www.aws.org/cgi-bin/swish.cgi?query=ultrasonic&start=30](http://www.aws.org/cgi-bin/swish.cgi?query=ultrasonic&start=30)  
*A list of search results of the American Welding Society which may lead to useful information.*
8. [PDF] Automatic Ultrasonic Weld Inspection  
[www.mechanicalintegrityinc.com/AUTweld.PDF](http://www.mechanicalintegrityinc.com/AUTweld.PDF)  
*This seems to be a useful commercial information of a company*
9. TPT Nondestructive Testing & Nondestructive Evaluation Services  
[www.twinportstesting.com/ndt.htm](http://www.twinportstesting.com/ndt.htm)  
*Homepage of a company which offers NDT services*
10. [PDF] ULTRASONIC TESTING  
[www.aindt.com.au/newsite/index.php?name=Downloads&req=getit&lid=17](http://www.aindt.com.au/newsite/index.php?name=Downloads&req=getit&lid=17)  
*A course information of the Australian Society for NDT.*

This search example shows the typical problems of a general Internet search engine like Google:

1. No specific group of information, like search of product or article
2. No time scale of the information
3. Ranking is not according to the usefulness of the hit

Although this is a critical assesment, no doubt a search via Google has also its benefits. For sure you will get something, especially for rare themes Google finds most of the time content on the Internet.

## Database Search in NDT.net

The NDT.net database uses MySQL. MySQL (SQL=Structure Query Language) is the world's most popular open source database software, with over 10 million active installations. Many of the world's largest and fastest-growing organizations use MySQL to save time and money powering their high-volume Web sites, business-critical systems and packaged software -- including industry leaders such as Yahoo!, Alcatel, The Associated Press, Suzuki and NASA [1].

We compare the Internet search “ultrasonic weld testing” with a search in NDT.net database. First the database offers the possibility to select a specific field where we want to search.

1. Article & News
2. Web Resources
3. Products and Services
4. Forum Discussions
5. Employment

Fig.2 Navigation to a specific information field

Let us decide to do an article search which will show us in principle what the benefits of using an SQL are. The search form offers a lot of filters which we may use to limit the search. Someone who prefers not to use the filters just needs to enter a term into the search field.

Fig.3 Database search form

Main search filters:

1. Age of the article
2. Language
3. Country of origin of the authors
4. Main stream NDT method like UT (ultrasonic testing)
5. Specific publication or conference proceedings
6. Articles of companies of the exhibition

In this search example we would select the filter 5 UT (ultrasonic testing). The other search term “weld” we enter in the text field box. The search text field offers us more options.

Where to search:

1. Whole Document
2. Title
3. Keyword
4. Author
5. Institution

It makes sense to choose one of the 1-3 filter options. If we search in title we will encounter the subject very well but much more if we search in keywords. If we do not chose the keyword limiter the search is independent of human selected keywords.

A typical search result is shown in Fig 4. The appearance of the search term is highlight in red. In this case appears in the title, in keywords and 45 times in the full-text. Attached to the author name “M. Moles” a link guides to 15 more articles in the database. A head icon indicates that the author is member of the forum and the stand icon links to his company in

the exhibition. The article was published in 2007-11 in the Pan-American Conference of NDT in the Ultrasonic session.

**Phased Arrays for Pipeline Girth Weld Inspections** PANNDT 2007 - Ultrasonic 2007-11

M. Moles , G. Fortier  
 Olympus NDT, Waltham, MA [USA] Stand

Ultrasonic Testing (UT), phased array, ASTM, pipeline girth welds, phased arrays  
 Search results: 45 weld

Fig. 4 A typical search result of total 587 results for ultrasonic weld testing

### Author Search Form

The author search form shows more capabilities of a database organized content.

**Text Search** **Database Search** **Authors & Institutions**

Brows or Filter ..... or/and enter a search term ....

ALL Authors (6871)

ALL Institutions (2265)

ALL Publications

Israel (31)

find in: Authors | sort: Authors

**Quick Search**

- TOP 100 Authors ?
- TOP 100 Institutions ?

[? Symbols](#)

**28 Authors**

Author	Institution / Department	City	Country
1 Abramovich, H.	5 Technion- Israel Institute of Technology	Haifa	Israel
3 Aharoni, R.	14 ScanMaster Systems (IRT) Ltd. <span style="border: 1px solid red; border-radius: 50%; padding: 2px;">Stand</span>	Kadima	Israel
1 Berkovitz, A.	5 Technion- Israel Institute of Technology	Haifa	Israel

Fig. 5 Author search form

Calculation of how many articles the author or institution have published and easy access to these articles is shown. A link near country opens a world map with shows the location of the city. Thanks to database design calculation of TOP 100 Authors or Institutions is also possible.

### CD Proceedings in the Database – One Click CD-Proceedings

The best way to produce CD proceedings starts by collecting all data in the MySQL Database of NDT.net. After this is done, the conference proceedings are virtually already in the basket of NDT.net database. However, before the conference took place the articles are not visible to the public. In the next step the database can produce by a “One Click” process the content of the CD proceedings. A conference specific design is just the main page of the CD and some conference specific “visuals” on each page. Fig. 6 shows the main page of a conference CD-proceedings.



Fig. 6 Example of CD-proceedings main Page

After the conference CD-Proceedings was released to the public, the CD is published one to one as “hard copy” in NDT.net as a static CD content. At the same time the content with all its articles is also visible as a part of the basket of literature. The result output of the database of this specific proceedings is shown in Fig. 7.



Your Selected Publication: [PANNDT 2007](#)  
 4th Pan American Conference for NDT - October 2007 - Buenos Aires, Argentina  
 More of this Source: - [Full-Text Search](#) - [Keywords](#) - [Authors](#)

Papers in Sessions:

**Search Results: 141**

Exhibitor Articles found: [Applus RTD Group](#), [Lucid Software Ltd.](#), [Olympus NDT](#), [TSC Inspection Systems](#), [YXLON International X-Ray GmbH](#)

File	Title / Author(s) / Keywords	PANNDT 2007 Session	Date
	<p><b>Obtención y Medida de Superficie Reflectora para Antena de Uso Satelital, Empleando Control Numérico Computarizado (CNC)</b></p> <p>J. Bava<sup>1</sup>, V. Sacchetto<sup>2</sup>, A. Maltz<sup>1</sup>, G. Rodriguez<sup>1</sup>, A. Szymanowski<sup>1</sup></p> <p><sup>1</sup>Facultad de Ingeniería <sup>2</sup>Facultad de Ciencias Exactas; Universidad Nacional de La Plata (UNLP), La Plata [Argentina]</p> <p><sup>2</sup>Facultad Regional La Plata; Universidad Tecnológica Nacional F. Regional La Plata, La Plata [Argentina]</p> <p>microwave (GPR), aerospace, millimetre wave, surface roughness</p>	Spanish	Aerospace 2007-11
	<p><b>Results of On-orbit Testing of an Extra-vehicular Infrared Camera Inspection System</b></p> <p>P. Howell, K. Cramer</p> <p>Nondestructive Evaluation Sciences Branch; NASA Langley Research Center, Hampton [USA]</p> <p>Infrared Testing (IRT)</p>	Aerospace	2007-11

Fig. 7 The standard conference proceedings database output format

The database search in Fig. 7 shows in the header specific information of this proceedings. A link to PANNDT 2007 leads to the hard copy of the static CD content. A list of Keywords, Authors, and Sessions of this specific proceeding is an evaluation of the complete content of all NDT.net database. That means the generation of a list of authors of the PANNDT 2007 conference is made every time an internet user clicks this link. That means no static page exists. The advantage of dynamic generation is clearly visible by the following example. If an author publishes new articles his or her number of papers and access to these papers are updated every time. Another simple example is the change of email address which is updated every time the list is generated.

### More Benefits of a Database

Precondition of achieving powerful database results it is necessary to break down the complete content into small pieces of information. You may wonder how many little pieces an article contains. The complete data of an article is storage in one table with a total of 15 individual data cells. Even more it is necessary to interact with many other tables to calculate

search results. For example a table “author” contains another set of 6 data: Author id, First Name, Last Name, Institute id, Profile id, and email. Another interacting table is the table “institution” which contains the 6 data: Institution id, Institution name, City id, Country id, exhibitor id, email. Of course tables of cities and countries are necessary too. NDT.net with all departments, articles, exhibition, forum, etc. consists in total of about 60 tables. With this principle it is possible to interact between all NDT.net departments, e.g. an institution of an article or news is indicated as exhibitor or an author is indicated with their forum-member profile and in the exhibition or forum the articles of an author or institution are shown.

Another example of powerful search evaluation is shown in Fig. 8.

Keyword: Ultrasonic Testing (UT), weld Search Results: 625	
Exhibitor Articles found:	<a href="#">AGR Technology Design</a> , <a href="#">Applus RTD Group</a> , <a href="#">ECLIPSE SCIENTIFIC PRODUCTS</a> , <a href="#">FORCE Technology</a> , <a href="#">GE Inspection Technologies</a> , <a href="#">Hillger Ing. Büro</a> , <a href="#">IMASONIC S.A.</a> , <a href="#">intelligeNDT Systems &amp; Services GmbH &amp; Co. KG</a> , <a href="#">KARL DEUTSCH</a> , <a href="#">Lavender International NDT Consultancy Services Ltd</a> , <a href="#">Lucid Software Ltd.</a> , <a href="#">Materials Research Institute</a> , <a href="#">Mecnov Inc</a> , <a href="#">MPV Meß- und Prüftechnik Vogt GmbH</a> , <a href="#">NDT.net</a> , <a href="#">Nordinkraft Company</a> , <a href="#">NUTRONIK GmbH</a> , <a href="#">Olympus NDT</a> , <a href="#">Phoenix Inspection Systems Ltd</a> , <a href="#">Physical Acoustics Ltd</a> , <a href="#">Qnet Engineering Ltd.</a> , <a href="#">RTE Akustik + Prüftechnik</a> , <a href="#">ScanMaster Systems (IRT) Ltd.</a> , <a href="#">Sonatest Ltd</a> , <a href="#">Sonatron NDT</a> , <a href="#">Sonovation B.V.</a> , <a href="#">STARMANS ELECTRONICS</a> , <a href="#">VOGT Werkstoffprüfsysteme GmbH</a> ,
Keywords found:	<a href="#">austenitic weld</a> , <a href="#">Automatic Immersion Testing of Welds</a> , <a href="#">copper canister weld</a> , <a href="#">Dissimilar Weld</a> , <a href="#">electrofusion welding</a> , <a href="#">electron beam welding</a> , <a href="#">friction stir welding</a> , <a href="#">Girth Welds</a> , <a href="#">laser weld inspection</a> , <a href="#">pipeline girth weld</a> , <a href="#">spot weld</a> , <a href="#">stainless steel welds</a> , <a href="#">thin welds</a> , <a href="#">TIG welding</a> , <a href="#">Tube to Endcap Fusion Welds</a> , <a href="#">Ultrasonic Testing (UT)</a> , <a href="#">weld</a> , <a href="#">weld detection</a> , <a href="#">weld root erosion</a> , <a href="#">weld seam</a> , <a href="#">weld seam test</a> , <a href="#">weld test</a> , <a href="#">welded pipes</a> , <a href="#">welded rings</a> , <a href="#">welded seams</a> , <a href="#">welded spots</a> , <a href="#">weldes seams coonnections</a> ,

Fig. 8 Complex but fast search evaluations

On the top of the list of search results are shown some related results of the search term “UT of weld”. The first block summarizes exhibitor articles and how many of each is within the 652 results. The Second block shows related keywords and how many articles deliver each keyword.

For other departments different search interfaces are provided. Fig 9 shows the exhibition search form. Like for articles the exhibitor information is loaded in many pieces in different SQL tables. Tables like NDT Methods or Countries are common tables for use in different NDT.net departments of Forum, Web Resources etc. Another advantage of this structure is the possibility to change a value only at one place for being effective in all departments at once. For example, if one wants to change country name China to PR China, they can do this in a second for all departments.



Fig. 9 Exhibition search form shows more advantages of SQL

A Nondestructive Testing Encyclopaedia was written many years ago as static HTML pages. Soon it was obvious that the maintenance of such a content could not be done by humans

without support of artificial intelligence. In a recent development the content was transferred into the SQL. A programming in PHP handles the user interface to display the content and to manage forms for new contributions and updates. Without human work data exchange with other departments of NDT.net is always up to date, e.g. showing exhibitor products and articles.

The new version offers many more features and usability. The design gives access to multiple resources from one location, delivering results with a range of content including encyclopaedia articles, related database articles, related Web sites, related Exhibitors and much more. Dynamic database queries to all other NDT.net databases make it self-maintaining and always up to date.

Fig. 10 shows the example of laser ultrasound. Any new articles of this keyword will be automatically added. It is obvious that this could not be practically done by human input.

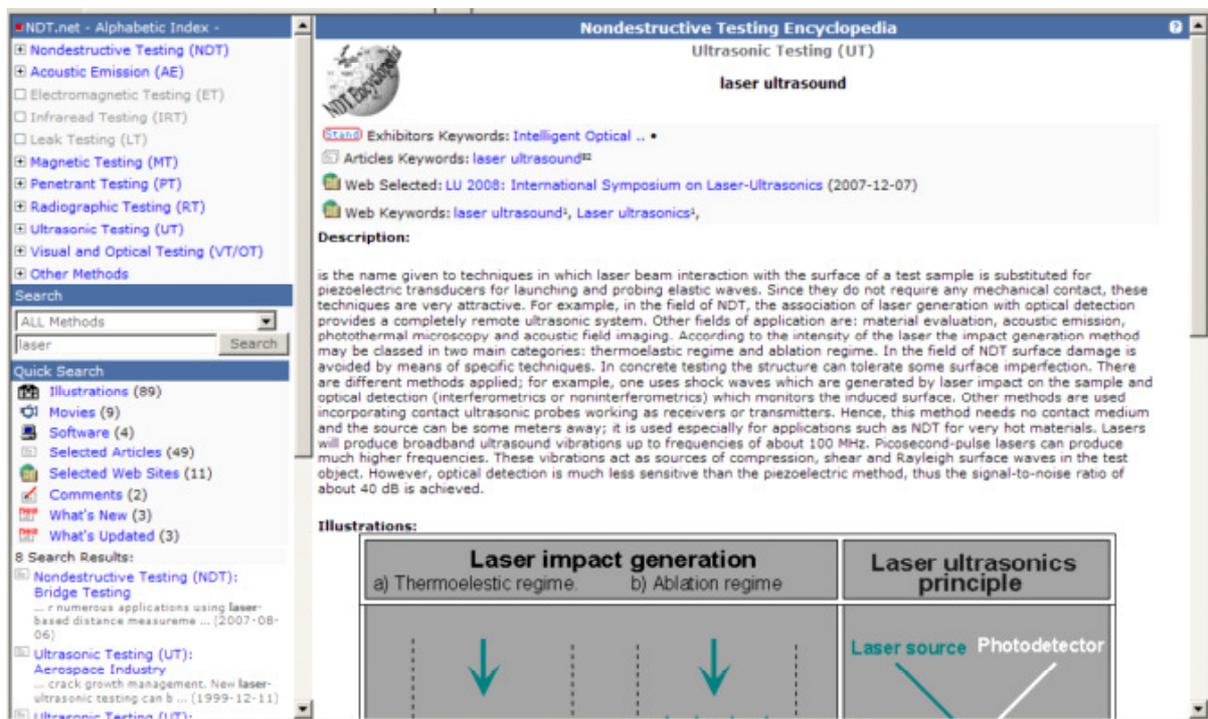


Fig. 10 SQL based Nondestructive Testing Encyclopaedia

## Conclusion

The NDT.net database provides NDT publishers (Conferences and Journals) a free Internet publishing service for articles, and in addition CD-ROM proceedings. That means NDT.net creates and hosts the electronic addition of conference proceedings or other publications in the database free of charge. Internet users can search through one connectivity NDT Database which can be obviously be more effective than a regular Internet search. Innovative database functions serve as an Holistic Marketing concept which leads to a maximum exposure of exhibitors.

## References

1. MySQL Conference & Expo 2008, <http://press.oreilly.com/pub/pr/1936>