Belgische Vereniging voor Documentatie - Inforum 2005 - 28 /04 /2005

Document- and content-management: a thesaurus and onto-thesaurus approach

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28 /04 /2005

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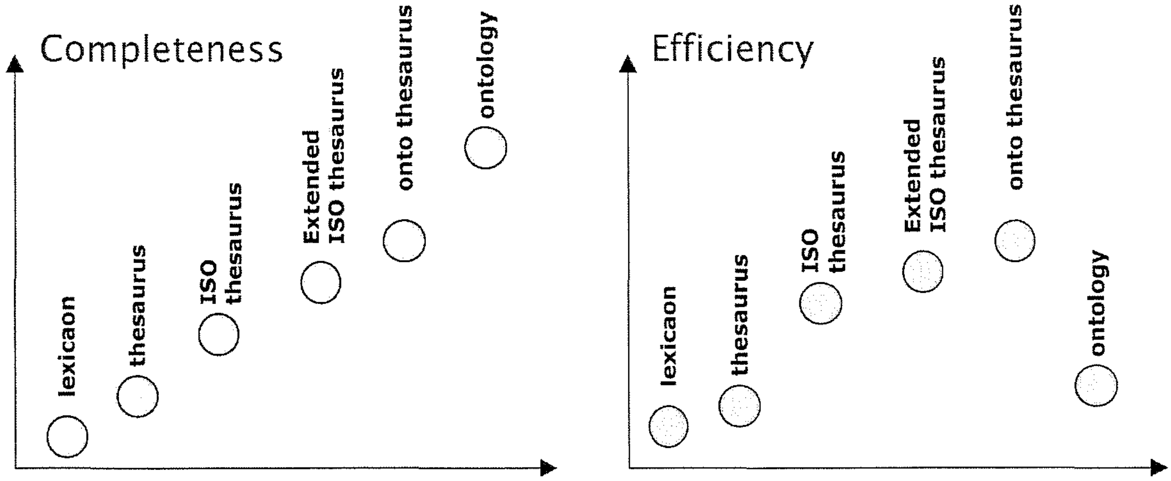
Content

- Introduction and overview
  - DMS, CMS, ISO standards, thesaurus and onto-thesaurus
- Full-text versus thesaurus-based search
- Thesaurus and onto-thesaurus life cycle
- Creation of ISO thesauri : IKEM.ThesCreator™
- Maintenance of multilingual, multidomain ISO thesauri : IKEM.ThesEditor™
- Full-text, thesaurus,IKEM.Onto-thesaurus™ and IKEM.QueryExpander™
- Live demonstration
- Conclusions

DMS/CMS knowledge-base options



Controlled vocabulary management

Developing, maintaining and managing controlled vocabularies (lexicons, standard ISO thesauri, ...) requires efforts depending on the vocabulary type

Problems, like
- Integration with document and content-managemet systems
- Completeness of the description
- Relevancy
- Consistency

IT solutions
- General groupware not well suited
- Dedicated software is a better option

Thesaurus standard: ISO 2788

ISO 2788: a mainstream standard for monolingual thesauri

The ISO 2788 standard defines an ISO thesaurus as a vocabulary of a controlled indexing language, organized so that the a priori relationships between concepts are made explicit.

ISO relation types

BT:	Broader term
NT:	Narrower term
RT:	Related term
USE:	Preferred term
UF:	Use For (non-preferred term)
SN:	Scope Note

ISO 2788 : Thesaurus relations

- hierarchic relations (broader/narrow (BT-NT) terms)

  e.g., *Asia --> broader term --> India*

- equivalent relations (use/use for (USE-UF) relations)

  e.g., *plastics* -->use for --> *polyethylene*

- related terms (associative (RT) relations)

  e.g. *vehicles--> rt --> wheels*

- *scope notes (examples, definitions (SN))*

  e.g. “audit client - person or organization commissioning the audit”

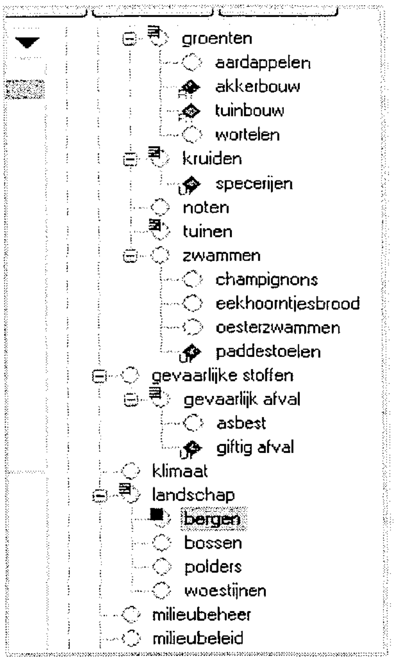
Thesaurus management: IKEM™

IKEM – Interactive Knowledge Management

A dedicated extensive, collaborative web-based software suite for document- and content-management

- ISO 2788 compliant
- ISO 5964 compliant
- Optionally supports extensions beyond ISO

IKEM.TreeView
An example from
IKEM.ThesEditor 2005



- groenten
  - aardappelen
  - akkerbouw
  - tuinbouw
  - wortelen
- kruiden
  - specerijen
- noten
- tuinen
- zwammen
  - champignons
  - eekhoorntjesbrood
  - oesterzwammen
  - paddestoelen
- gevaarlijke stoffen
  - gevaarlijk afval
    - asbest
    - giftig afval
- klimaat
- landschap
  - bergen
  - bossen
  - polders
  - woestijnen
- milieubeheer
- milieubeleid

Built-in ISO types	Extensions beyond ISO
○ Hierarchic (BT/NT)	■ Homonymy
◆ Related Term (RT)	☰ Polyhierachy (multi-BT)
◆ Use For (UF)	
⇨ USE	

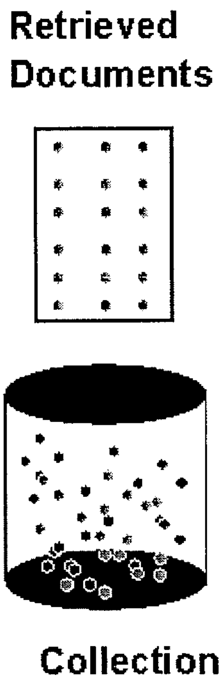
Full-text indexing: recall & precision

- **Precision**

$$\frac{\#\,\text{relevant retrieved}}{\#\,\text{retrieved}}$$

- **Recall**

$$\frac{\#\,\text{relevant retrieved}}{\#\,\text{relevant in collection}}$$

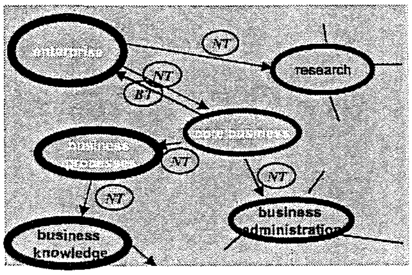


IKEM: Implicit knowledge

Business knowledge.

Business organisations have to acquire and apply *business knowledge* from a wide range of sources, both internal and external.

The business model is closely related to *business knowledge.*


enterprise
NT
research
NT
BT
core business
business processes
NT
NT
NT
business knowledge
business administration

Explicit

K-terms

Business knowledge 3

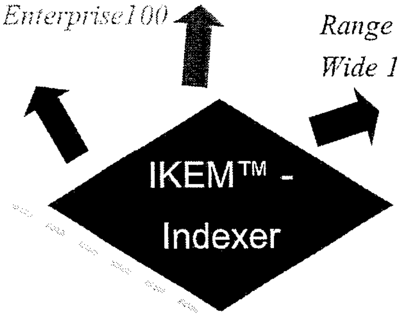
Implicit

I-terms

Business processes 300

Core business 133

Enterprise100


IKEM™ -
Indexer

Business 1

External 1

Internal 1

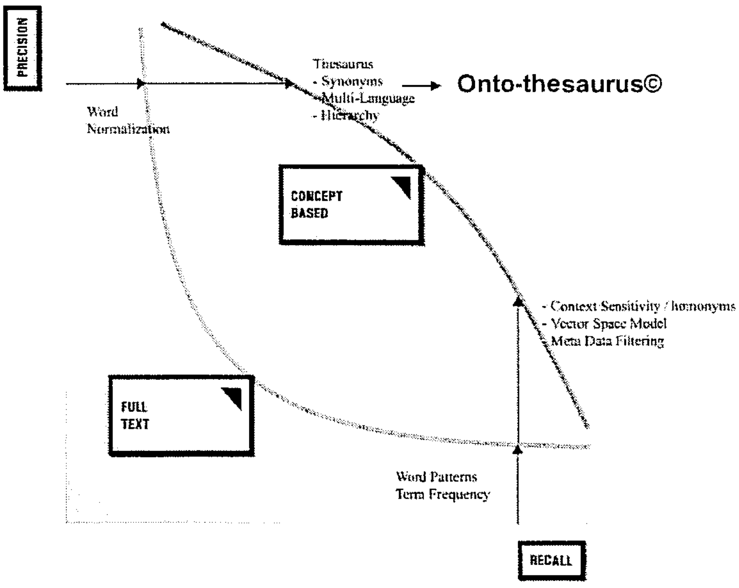
Organisations 1

Range 1

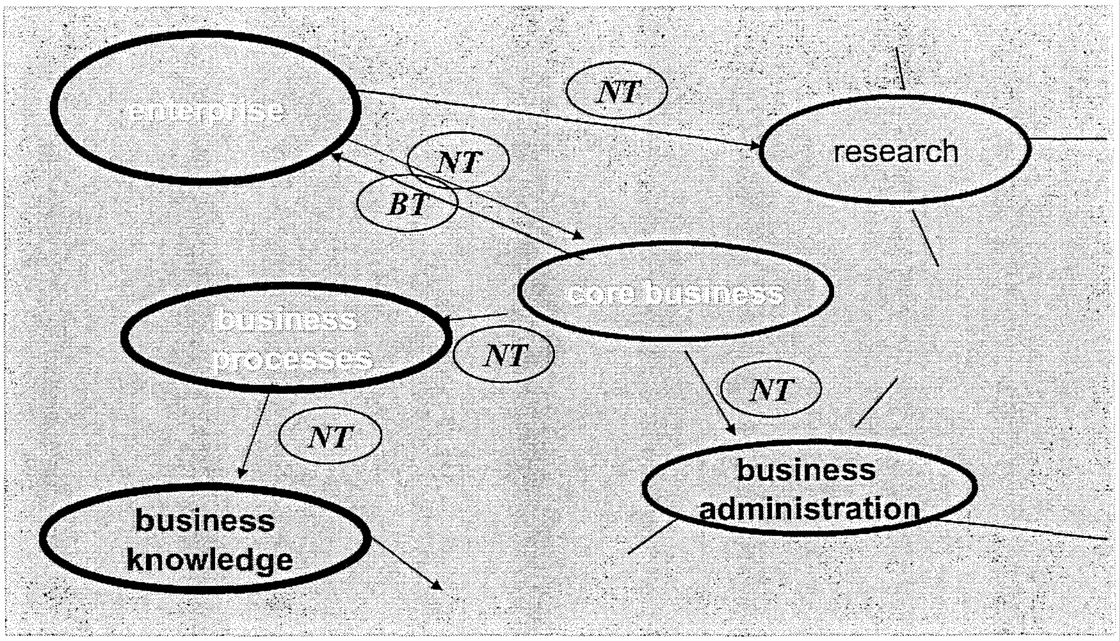
Wide 1

IKEM: Thesaurus & onto-thesaurus

- Thesauri and onto-thesauri offer an improvement of recall and precision

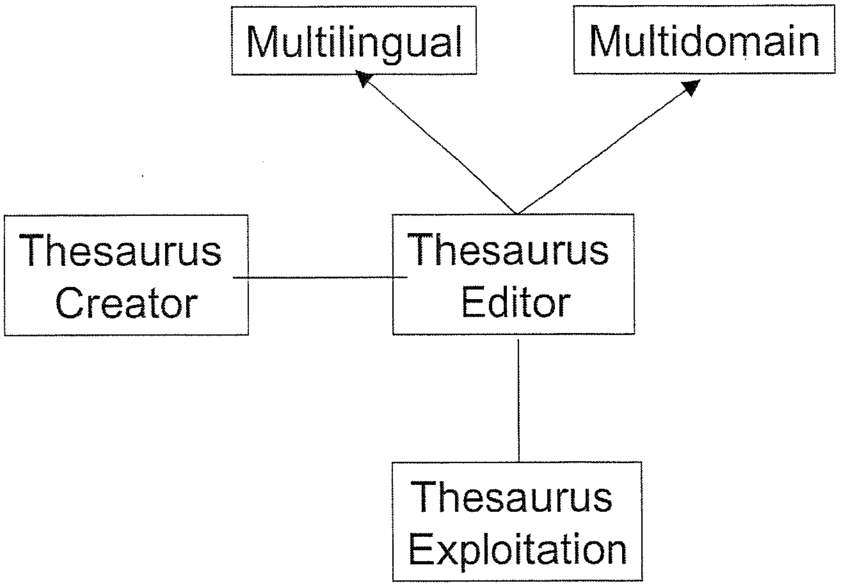

PRECISION
Word
Normalization
Thesaurus
- Synonyms
- Multi-Language
- Hierarchy
Onto-thesaurus©
CONCEPT
BASED
- Context Sensitivity / homonyms
- Vector Space Model
- Meta Data Filtering
FULL
TEXT
Word Patterns
Term Frequency
RECALL

IKEM : implicit knowledge


enterprise
NT
research
NT
BT
core business
business processes
NT
NT
NT
business knowledge
business administration

Thesaurus and onto-thesaurus life-cycle

Thesaurus life-cycle



Multilingual

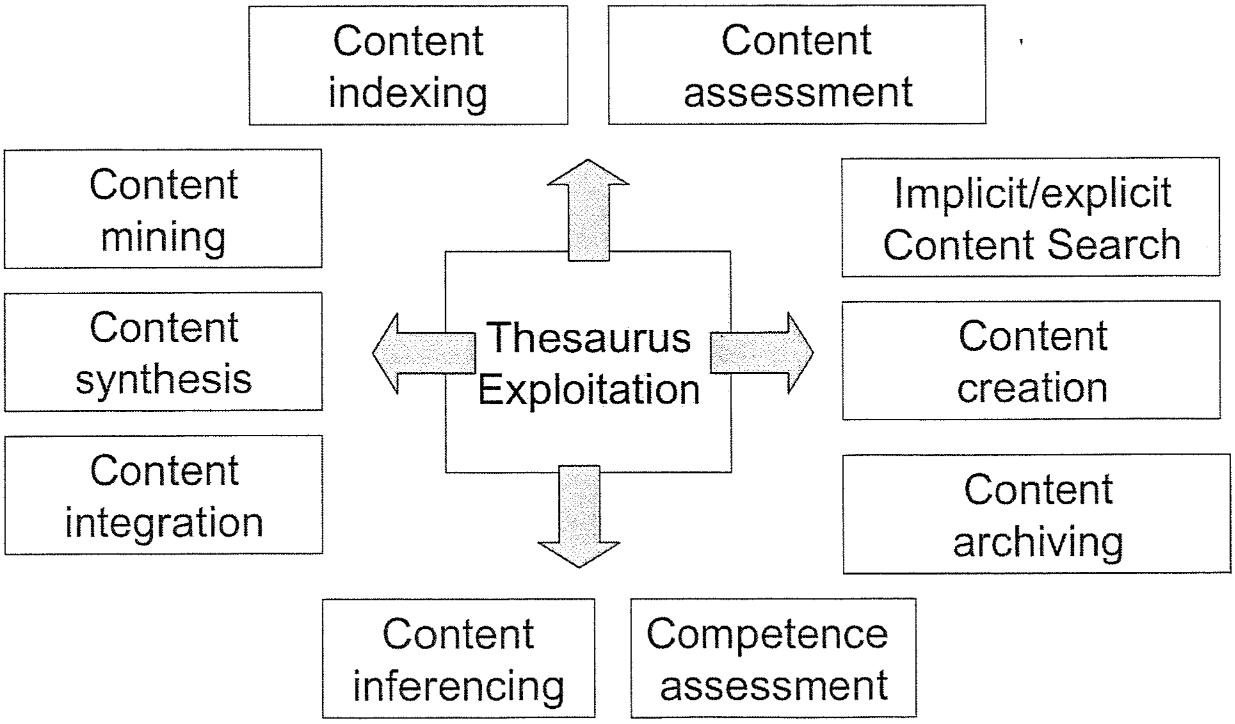
Multidomain

Thesaurus Creator

Thesaurus Editor

Thesaurus Exploitation

Thesaurus life-cycle



Content indexing

Content assessment

Content mining

Implicit/explicit Content Search

Content synthesis

Thesaurus Exploitation

Content creation

Content integration

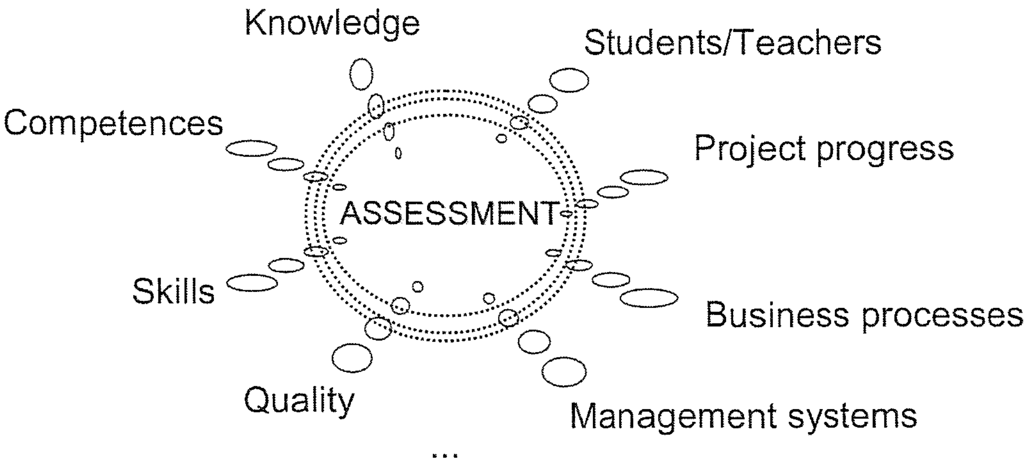
Content archiving

Content inferencing

Competence assessment

Thesaurus and onto-thesaurus based assessment

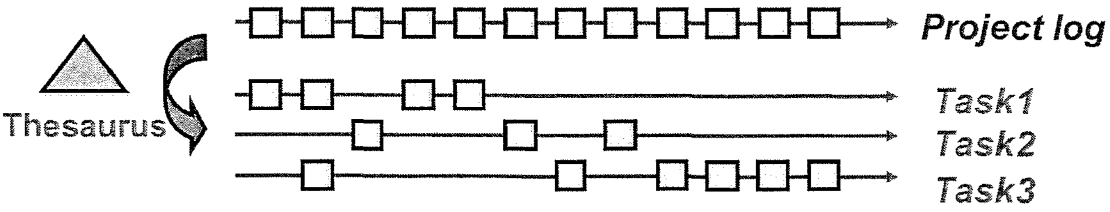
Assessment = any method used to better understand the present knowledge, skills or competencies of an individual, and the quality or characteristics of a process


Knowledge
Students/Teachers
Competences
Project progress
ASSESSMENT
Skills
Business processes
Quality
Management systems
...

Project assessment: message analysis

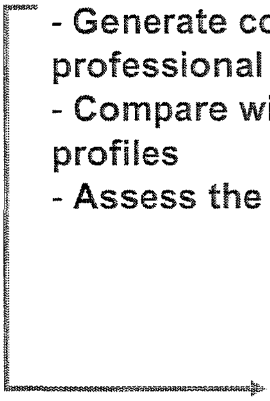
Project Views:

- ***Task view***
  - *-dynamic overview of tasks as a function of time*
  - *-can be linked with project- and task specification*
- ***Coordination view***
  - *-early warnings regarding possible delays in project realisation*
- ***Cooperation view***
  - *-using actor profiles to analyze the cooperation patterns*


Project log
Thesaurus
Task1
Task2
Task3

Competence assessment

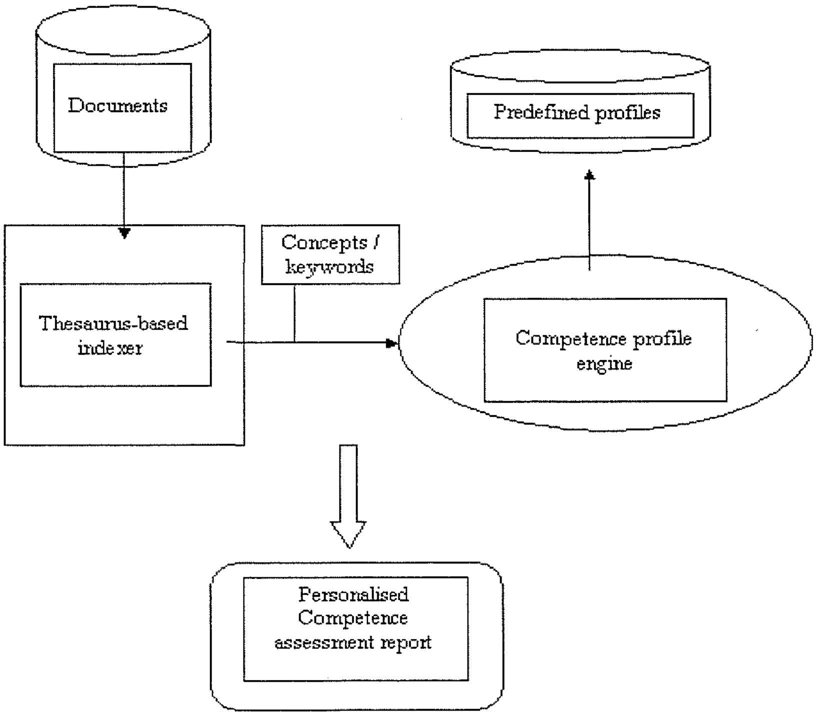
Major issues



- Generate competence profiles based on e.g. the indexation of professional documents
- Compare with competence profiles in time & with predefined profiles
- Assess the evolution in time

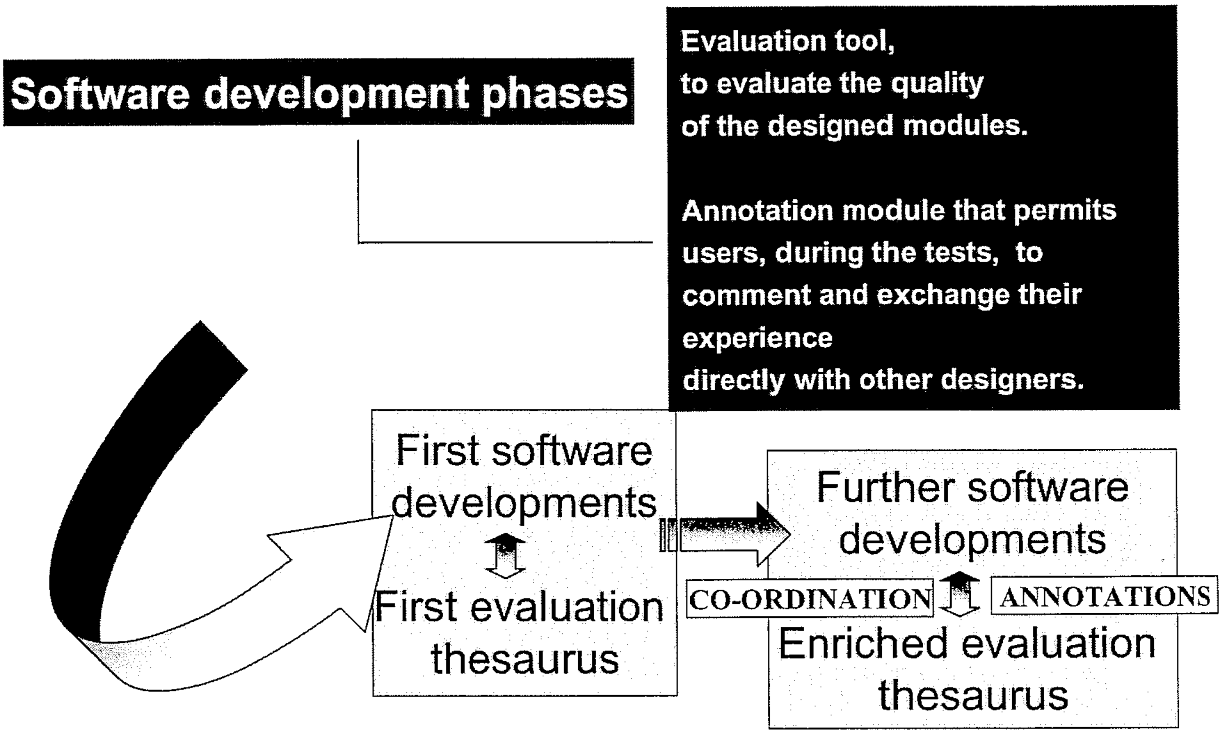
Personalised competence assessment report

Competence assessment



Documents
Predefined profiles
Concepts / keywords
Thesaurus-based indexer
Competence profile engine
Personalised Competence assessment report

Software Assessment



Software development phases

**Evaluation tool,
to evaluate the quality
of the designed modules.**

Annotation module that permits users, during the tests, to comment and exchange their experience directly with other designers.

First software developments

First evaluation thesaurus

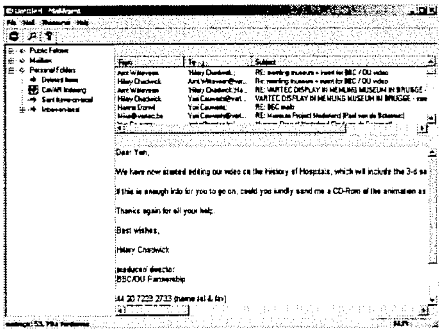
Further software developments

CO-ORDINATION

ANNOTATIONS

Enriched evaluation thesaurus

Software Assessment



Dear Yan,

We have now started editing our video on the History of Hospitals, which will include the 3-d sa

If this is enough info for you to go on, could you kindly send me a CD-Rom of the animation as

Thanks again for all your help.

Best wishes,

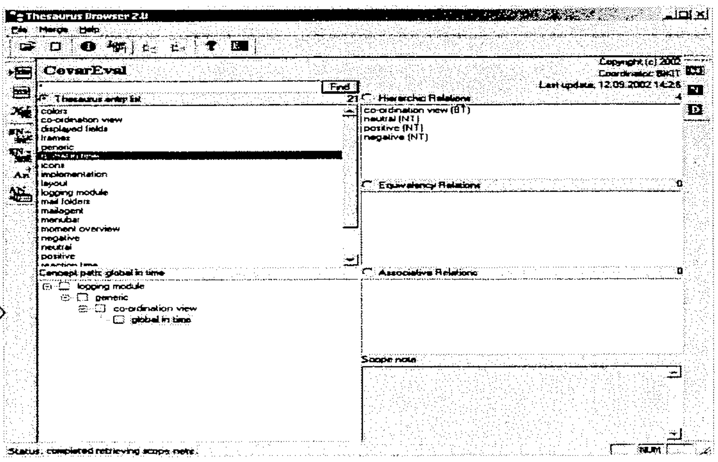
Hilary Chadwick

producer/ director
BBC/OU Partnership

44 20 7222 2733 (home tel & fax)

First phase application

First phase thesaurus



CovarEval

Copyright (c) 2002
Coordinator: BKIT
Last update: 12.09.2002 14:26

Thesaurus entry list 21

colors
co-ordination view
displayed fields
frames
generic
icons
implementation
layout
logging module
mail folders
mailagent
menubar
moment overview
negative
neutral
positive

Concept path: global in time

- logging module
  - generic
    - co-ordination view
      - global in time

Hierarchic Relations 4

co-ordination view (BT)
neutral (NT)
positive (NT)
negative (NT)

Equivalency Relations 0

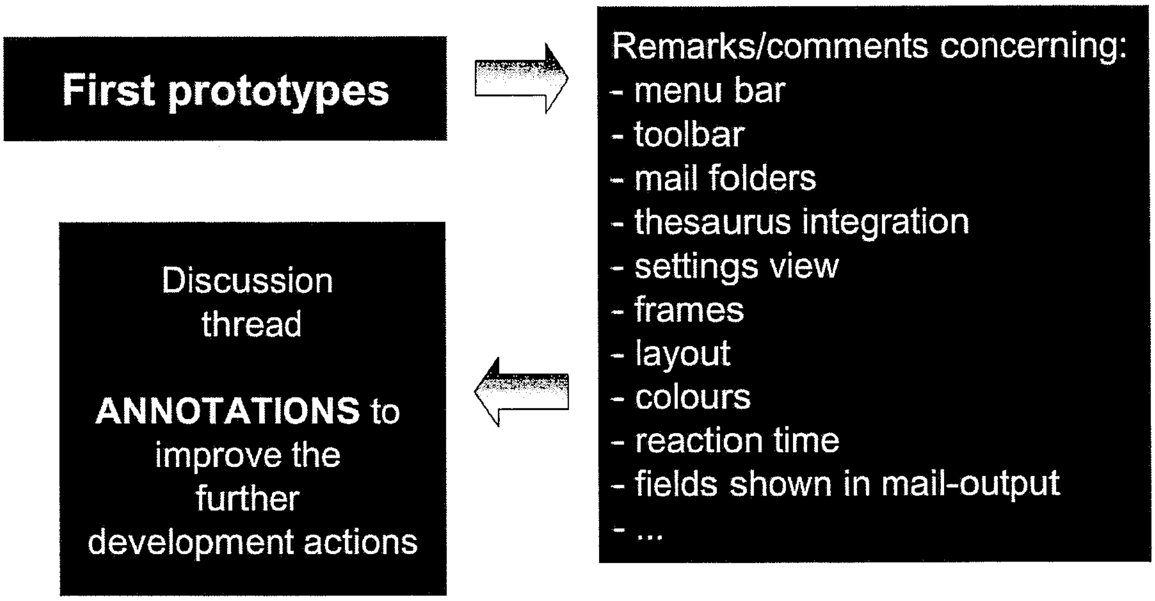
Associative Relations 0

Scope note

Status: completed retrieving scope note.

Thesaurus covering the preliminary software developments

Software Assessment



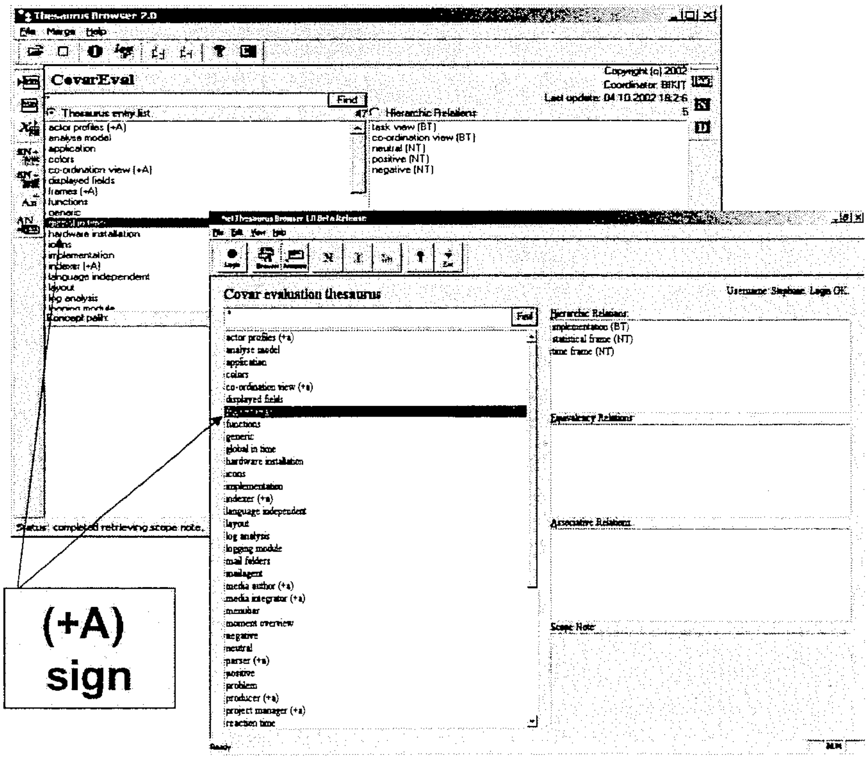
First prototypes

Remarks/comments concerning:
- menu bar
- toolbar
- mail folders
- thesaurus integration
- settings view
- frames
- layout
- colours
- reaction time
- fields shown in mail-output
- ...

Discussion thread

ANNOTATIONS to improve the further development actions

Software Assessment


Thesaurus Browser 2.0
File Merge Help
Find
Copyright (c) 2002
Coordinator: BIKIT
Last update: 04.10.2002 18:26
Status: completed retrieving scope note.
Net Thesaurus Browser 1.0 Beta Release
File Edit View Help
Find
Ready

CovarEval

Thesaurus entry list 47

actor profiles (+A)
analyse model
application
colors
co-ordination view (+A)
displayed fields
frames (+A)
functions
generic
[illegible]
hardware installation
icons
implementation
indexer (+A)
language independent
layout
log analysis
logging module
Concept path:

Hierarchic Relations 5

task view (BT)
co-ordination view (BT)
neutral (NT)
positive (NT)
negative (NT)

Covar evaluation thesaurus

Username: Stephane. Login OK.

*

actor profiles (+a)
analyse model
application
colors
co-ordination view (+a)
displayed fields
[illegible]
functions
generic
global in time
hardware installation
icons
implementation
indexer (+a)
language independent
layout
log analysis
logging module
mail folders
mailagent
media author (+a)
media integrator (+a)
menubar
moment overview
negative
neutral
parser (+a)
positive
problem
producer (+a)
project manager (+a)
reaction time

Hierarchic Relations:
implementation (BT)
statistical frame (NT)
time frame (NT)

Equivalency Relations:

Associative Relations:

Scope Note:

(+A) sign

Evolution in thesaurus

↓

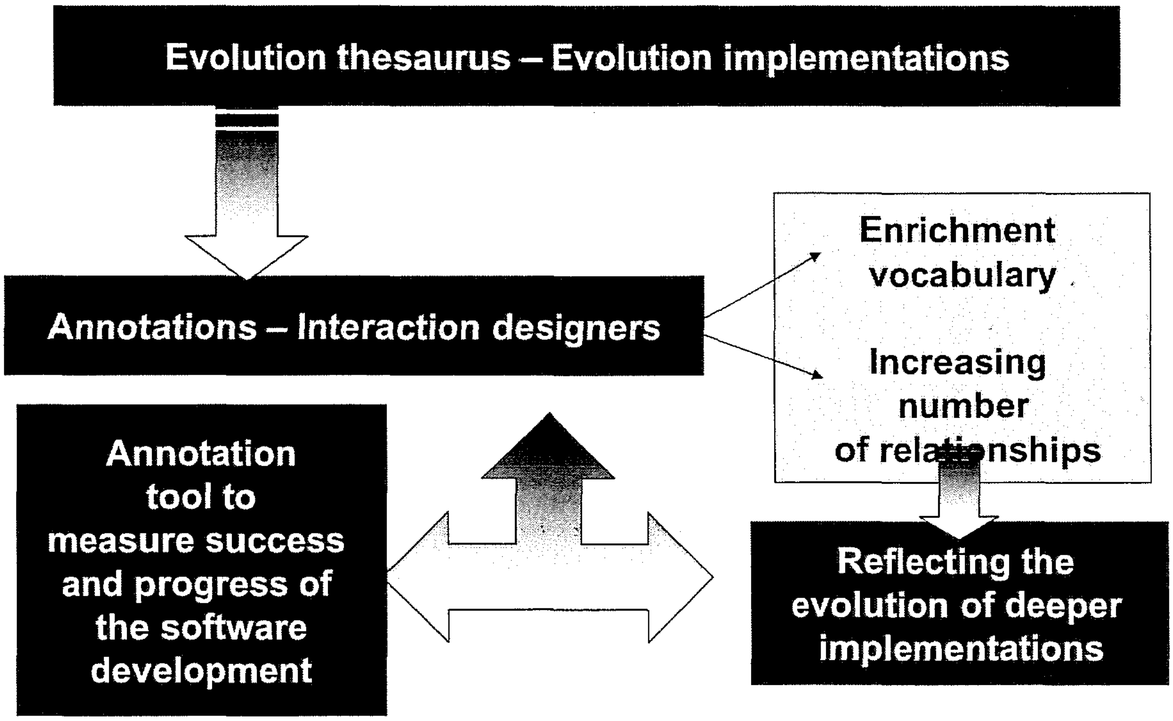
Evolution in annotations

↓

Evolution in development

↓

Software Assessment



Evolution thesaurus – Evolution implementations

Annotations – Interaction designers

Enrichment vocabulary

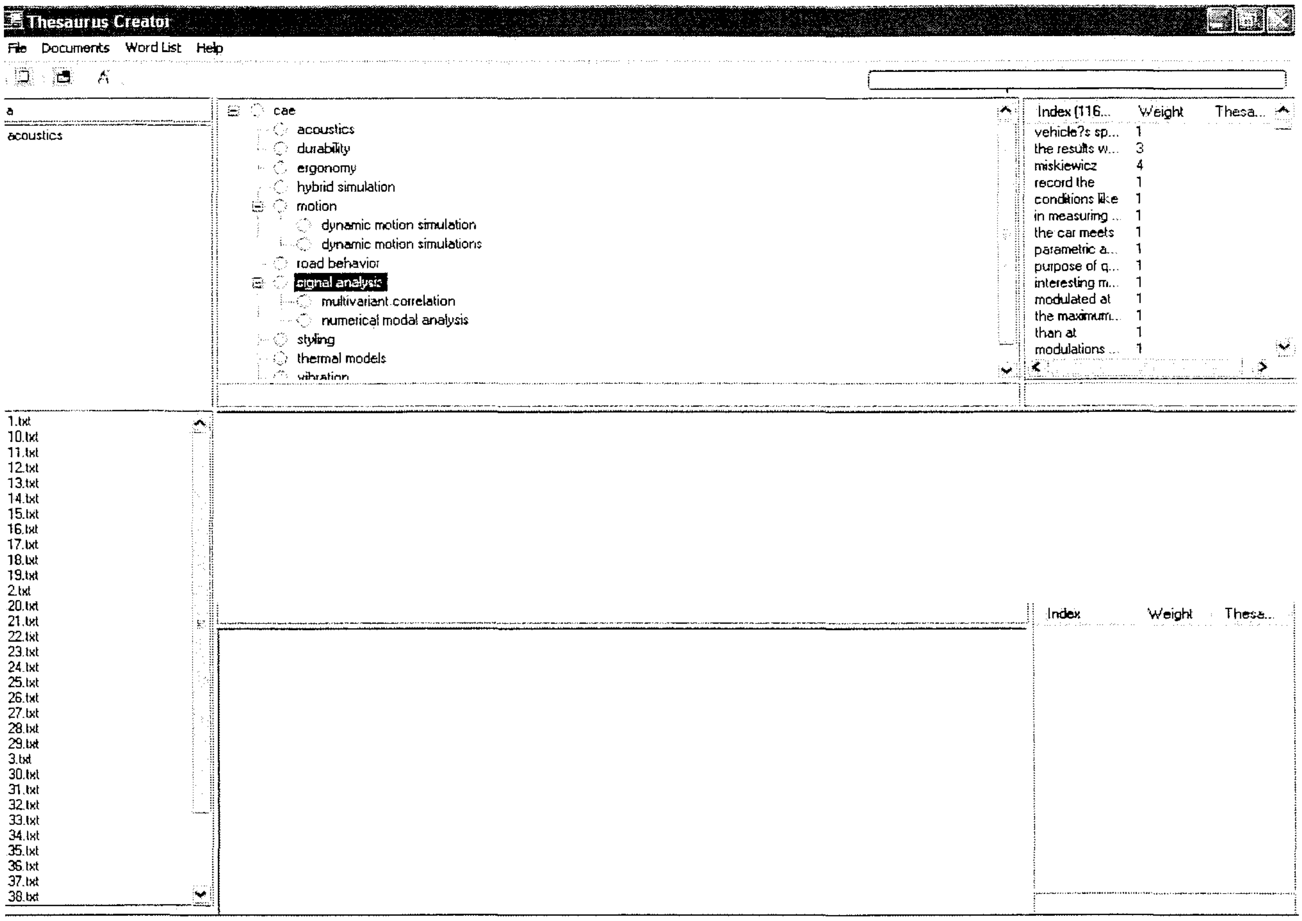
Increasing number of relationships

Annotation tool to measure success and progress of the software development

Reflecting the evolution of deeper implementations

IKEM.ThesCreator™

Creation of ISO thesauri



a

acoustics

- cae
  - acoustics
  - durability
  - ergonomy
  - hybrid simulation
  - motion
    - dynamic motion simulation
    - dynamic motion simulations
  - road behavior
  - signal analysis
    - multivariant correlation
    - numerical modal analysis
  - styling
  - thermal models
  - vibration

Index (116...	Weight	Thesa...
vehicle?s sp...	1	
the results w...	3	
miskiewicz	4	
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conditions like	1	
in measuring ...	1	
the car meets	1	
parametric a...	1	
purpose of q...	1	
interesting m...	1	
modulated at	1	
the maximum...	1	
than at	1	
modulations ...	1	

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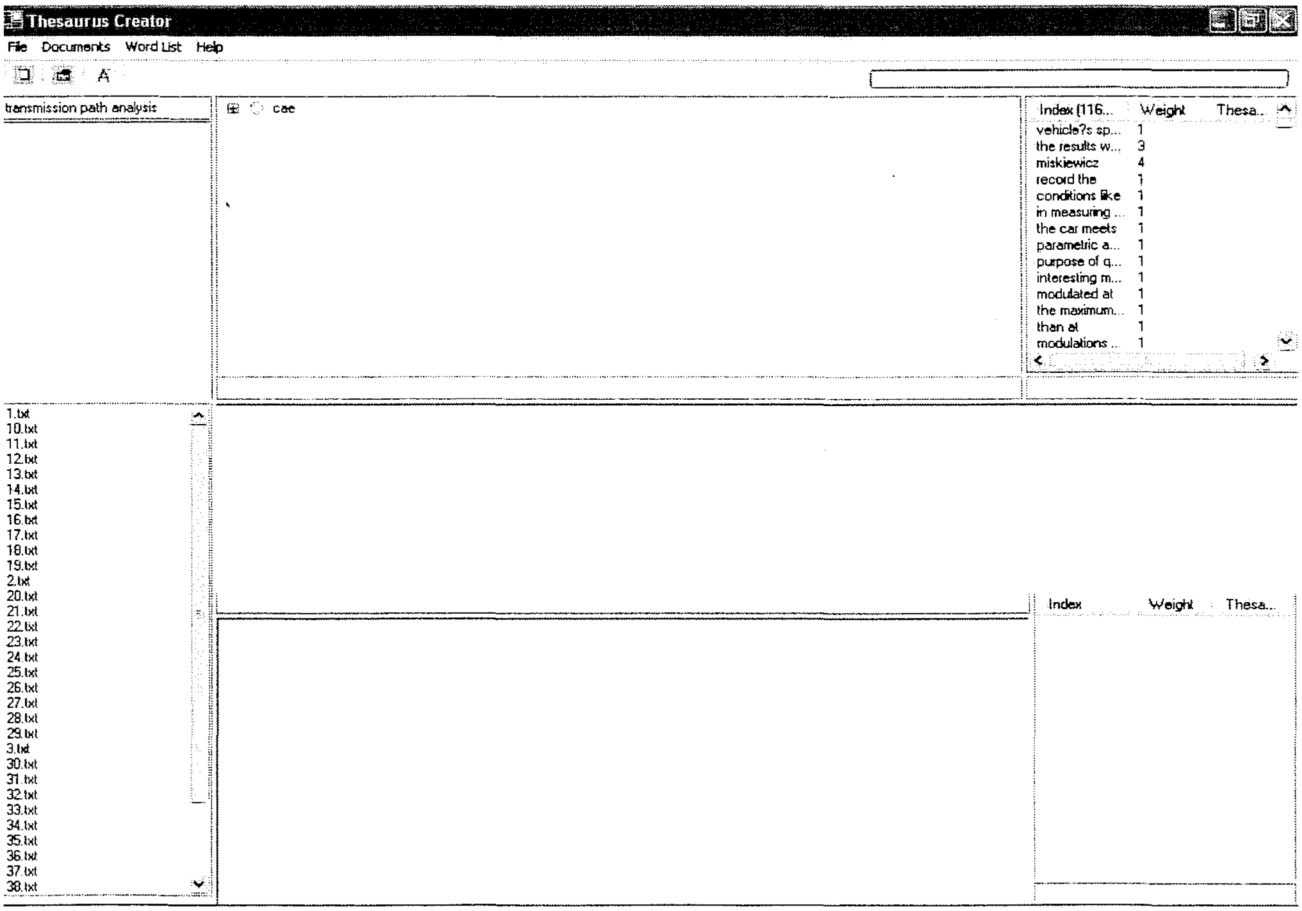
Index	Weight	Thesa...



transmission path analysis

- cae

Index (116...	Weight	Thesa...
vehicle?s sp...	1	
the results w...	3	
miskiewicz	4	
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conditions like	1	
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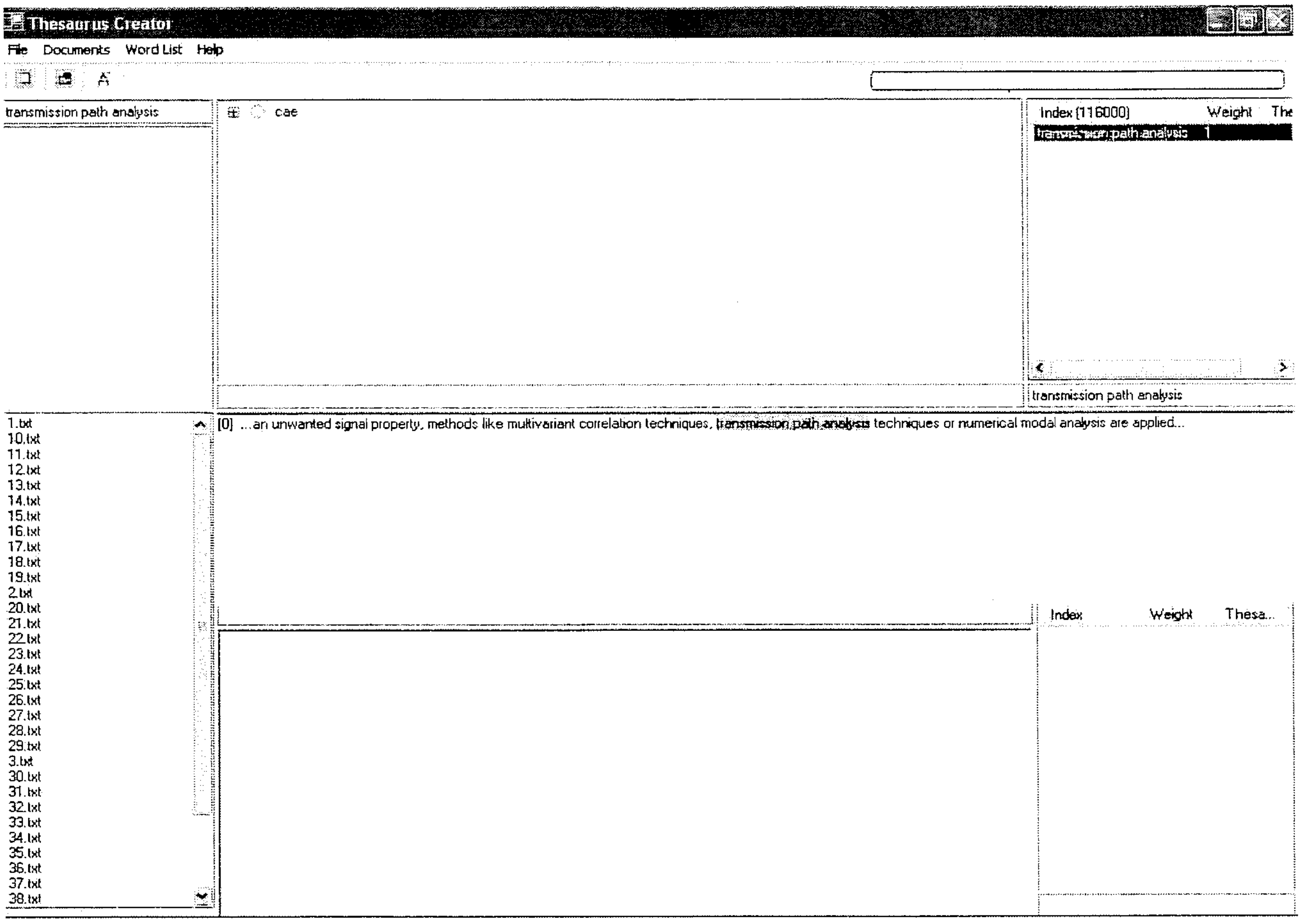
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Help
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cae
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Index (116000)	Weight	The
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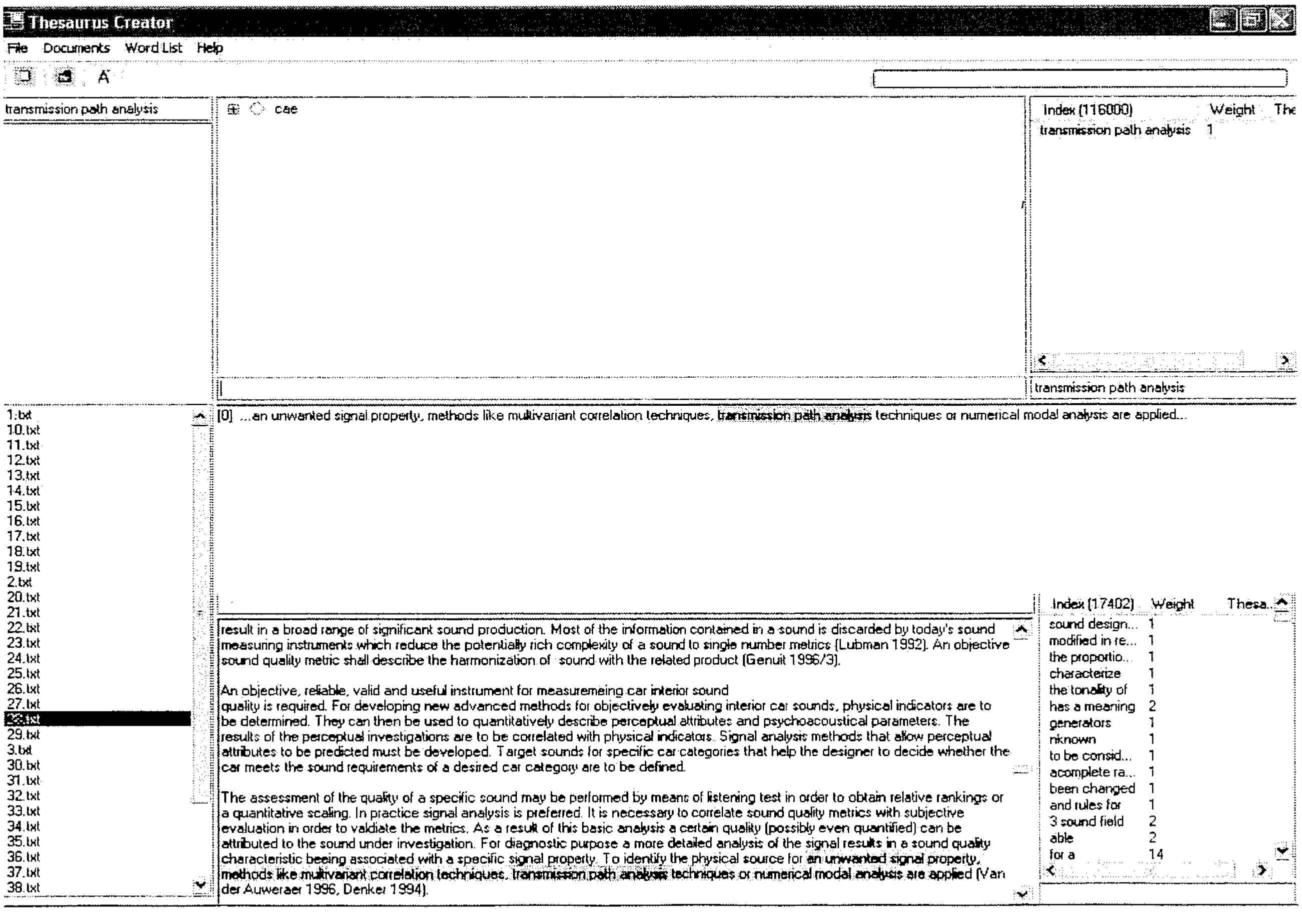
[0] ...an unwanted signal property, methods like multivariant correlation techniques, transmission path analysis techniques or numerical modal analysis are applied...


Thesaurus Creator
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Index (116000)
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Index (116000)	Weight	The
transmission path analysis	1	

[0] ...an unwanted signal property, methods like multivariant correlation techniques, transmission path analysis techniques or numerical modal analysis are applied...

result in a broad range of significant sound production. Most of the information contained in a sound is discarded by today's sound measuring instruments which reduce the potentially rich complexity of a sound to single number metrics (Lubman 1992). An objective sound quality metric shall describe the harmonization of sound with the related product (Genuit 1996/3).

An objective, reliable, valid and useful instrument for measuremeing car interior sound
quality is required. For developing new advanced methods for objectively evaluating interior car sounds, physical indicators are to be determined. They can then be used to quantitatively describe perceptual attributes and psychoacoustical parameters. The results of the perceptual investigations are to be correlated with physical indicators. Signal analysis methods that allow perceptual attributes to be predicted must be developed. Target sounds for specific car categories that help the designer to decide whether the car meets the sound requirements of a desired car category are to be defined.

The assessment of the quality of a specific sound may be performed by means of listening test in order to obtain relative rankings or a quantitative scaling. In practice signal analysis is preferred. It is necessary to correlate sound quality metrics with subjective evaluation in order to valdiate the metrics. As a result of this basic analysis a certain quality (possibly even quantified) can be attributed to the sound under investigation. For diagnostic purpose a more detailed analysis of the signal results in a sound quality characteristic beeing associated with a specific signal property. To identify the physical source for an unwanted signal property, methods like multivariant correlation techniques, transmission path analysis techniques or numerical modal analysis are applied (Van der Auweraer 1996, Denker 1994).

Index (17402)	Weight	Thesa...
sound design...	1	
modified in re...	1	
the proportio...	1	
characterize	1	
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and rules for	1	
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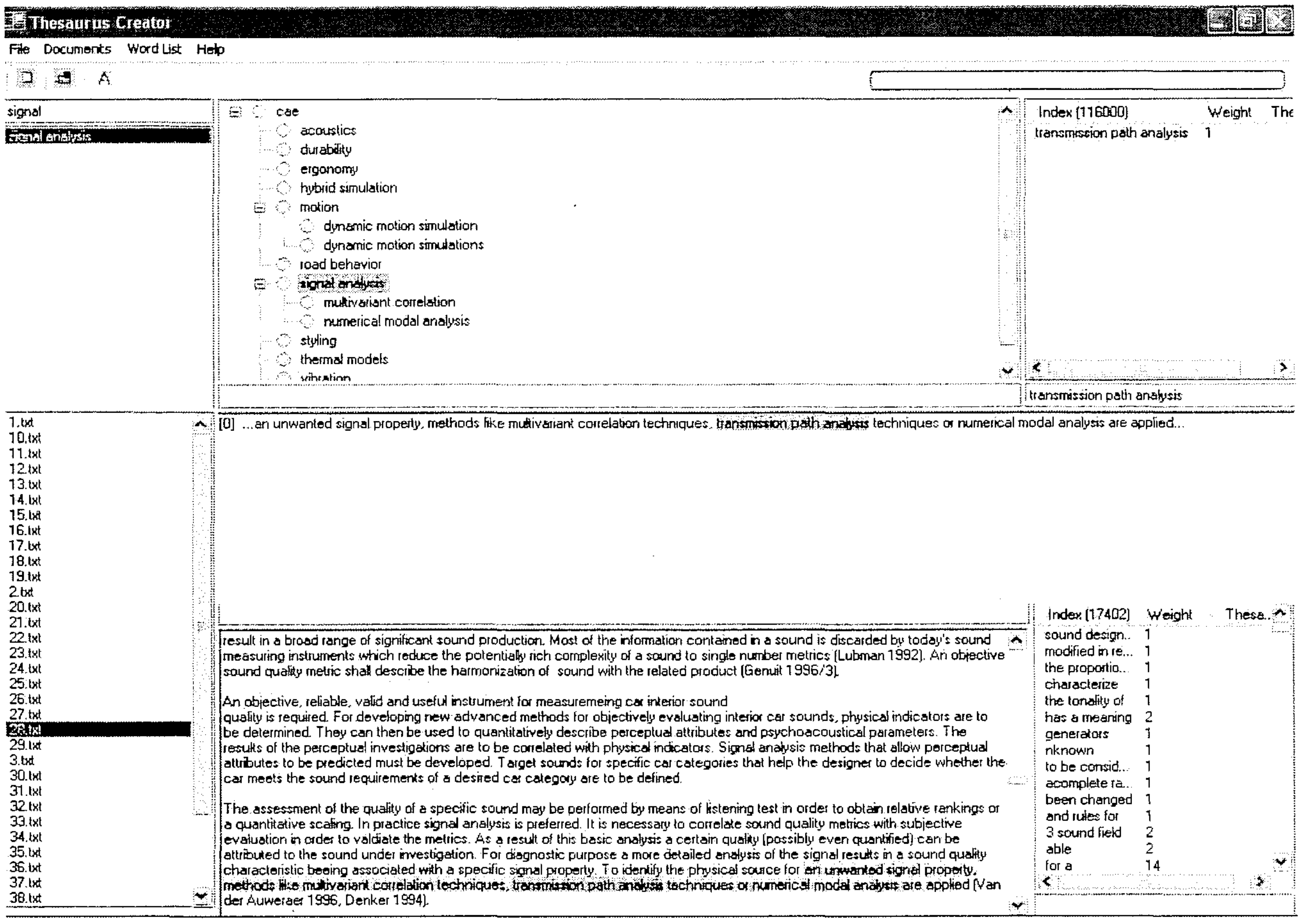
Thesaurus Creator
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signal
signal analysis
cae
acoustics
durability
ergonomy
hybrid simulation
motion
dynamic motion simulation
dynamic motion simulations
road behavior
signal analysis
multivariant correlation
numerical modal analysis
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Index (116000)	Weight	The
transmission path analysis	1	

transmission path analysis

[0] ...an unwanted signal property, methods like multivariant correlation techniques, transmission path analysis techniques or numerical modal analysis are applied...

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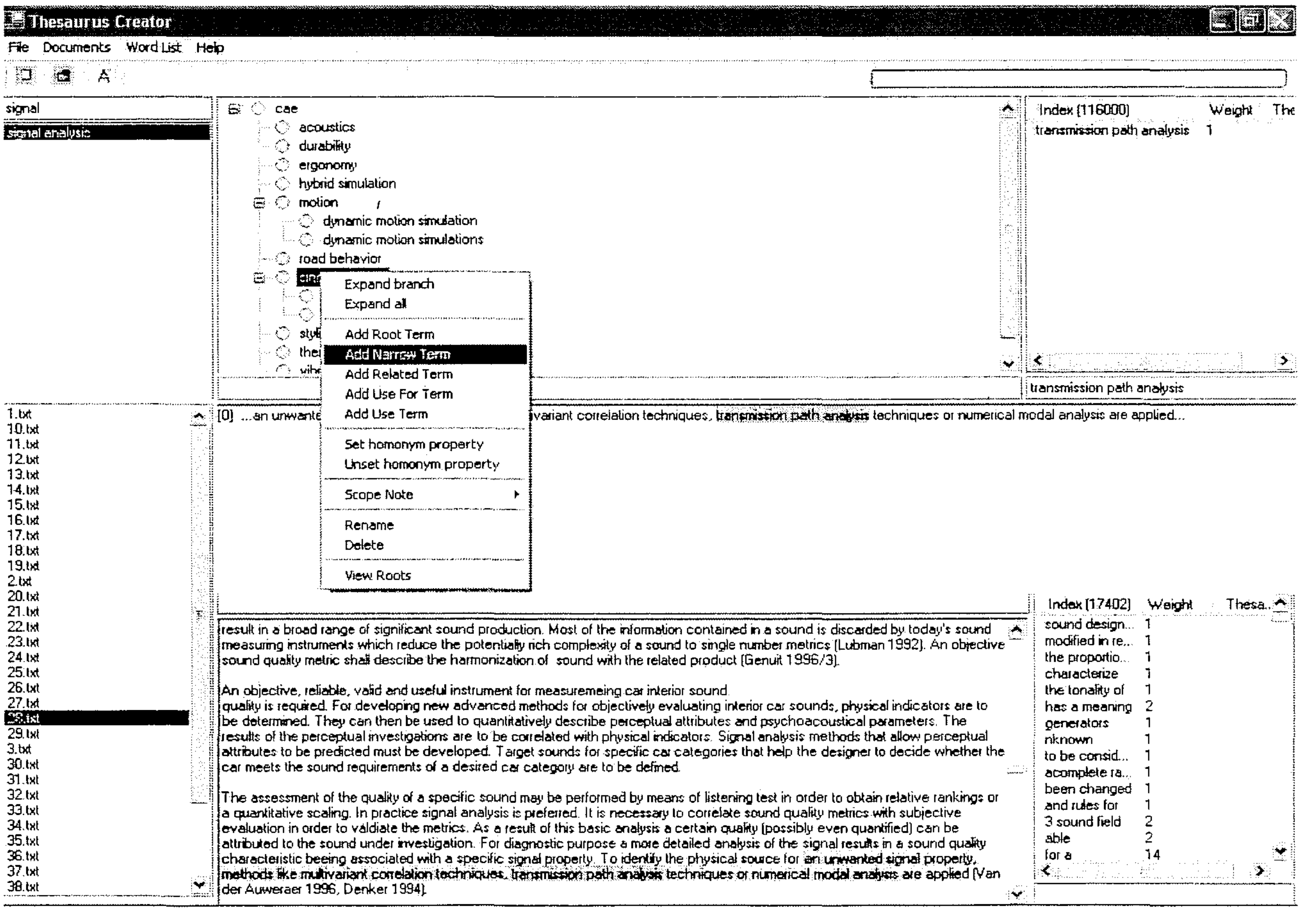
been changed	1	
and rules for	1	
3 sound field	2	
able	2	
for a	14	

33


Thesaurus Creator
File Documents Word List Help
signal
signal analysis
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acoustics
durability
ergonomy
hybrid simulation
motion
dynamic motion simulation
dynamic motion simulations
road behavior
Expand branch
Expand all
Add Root Term
Add Narrow Term
Add Related Term
Add Use For Term
Add Use Term
Set homonym property
Unset homonym property
Scope Note
Rename
Delete
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result in a broad range of significant sound production. Most of the information contained in a sound is discarded by today's sound measuring instruments which reduce the potentially rich complexity of a sound to single number metrics (Lubman 1992). An objective sound quality metric shall describe the harmonization of sound with the related product (Genuit 1996/3).

An objective, reliable, valid and useful instrument for measuremeing car interior sound
quality is required. For developing new advanced methods for objectively evaluating interior car sounds, physical indicators are to be determined. They can then be used to quantitatively describe perceptual attributes and psychoacoustical parameters. The results of the perceptual investigations are to be correlated with physical indicators. Signal analysis methods that allow perceptual attributes to be predicted must be developed. Target sounds for specific car categories that help the designer to decide whether the car meets the sound requirements of a desired car category are to be defined.

The assessment of the quality of a specific sound may be performed by means of listening test in order to obtain relative rankings or a quantitative scaling. In practice signal analysis is preferred. It is necessary to correlate sound quality metrics with subjective evaluation in order to valdiate the metrics. As a result of this basic analysis a certain quality (possibly even quantified) can be attributed to the sound under investigation. For diagnostic purpose a more detailed analysis of the signal results in a sound quality characteristic beeing associated with a specific signal property. To identify the physical source for an unwanted signal property, methods like multivariant correlation techniques, transmission path analysis techniques or numerical modal analysis are applied (Van der Auweraer 1996, Denker 1994).

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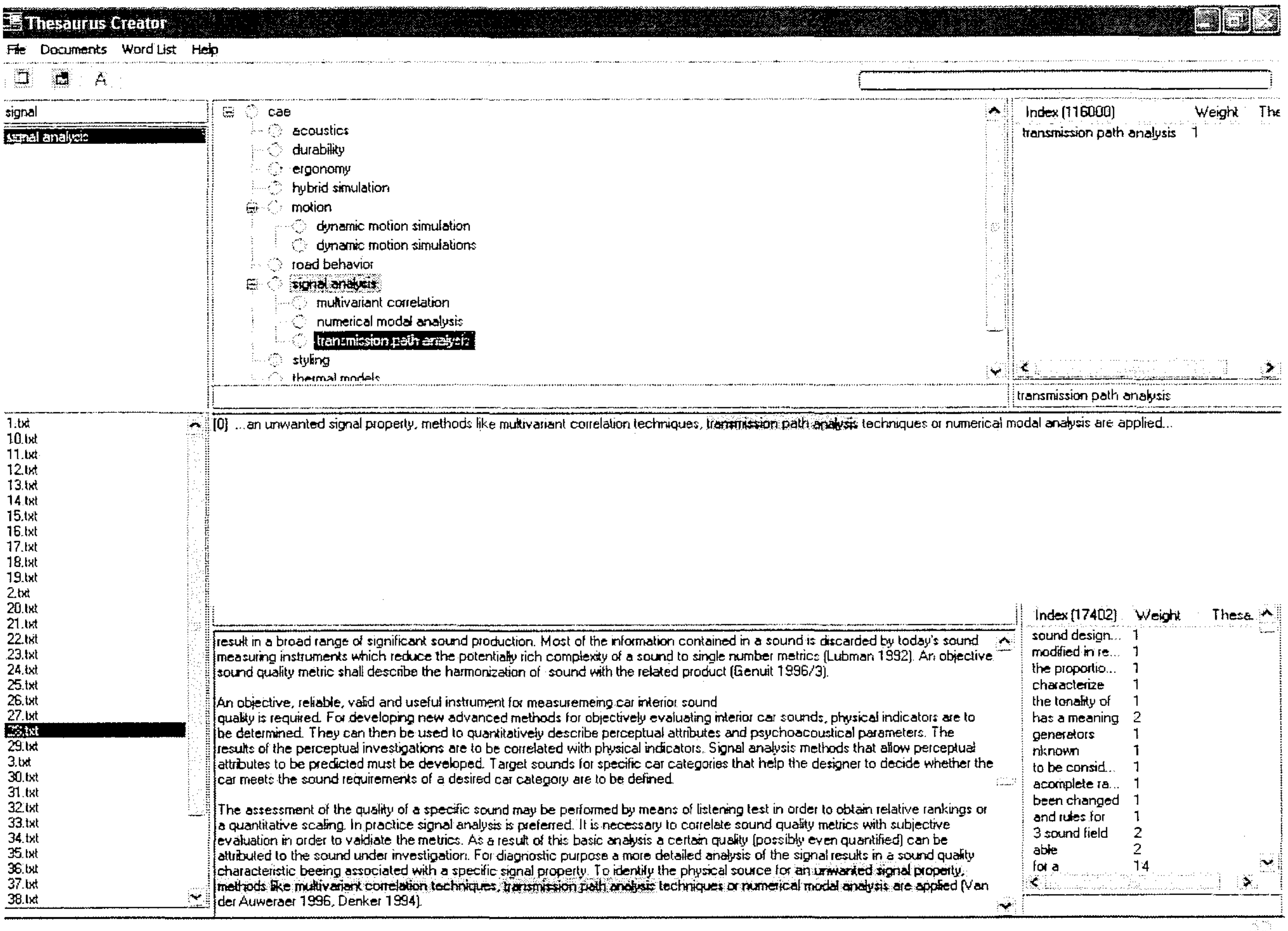
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signal

signal analysis

Index (116000)	Weight	The
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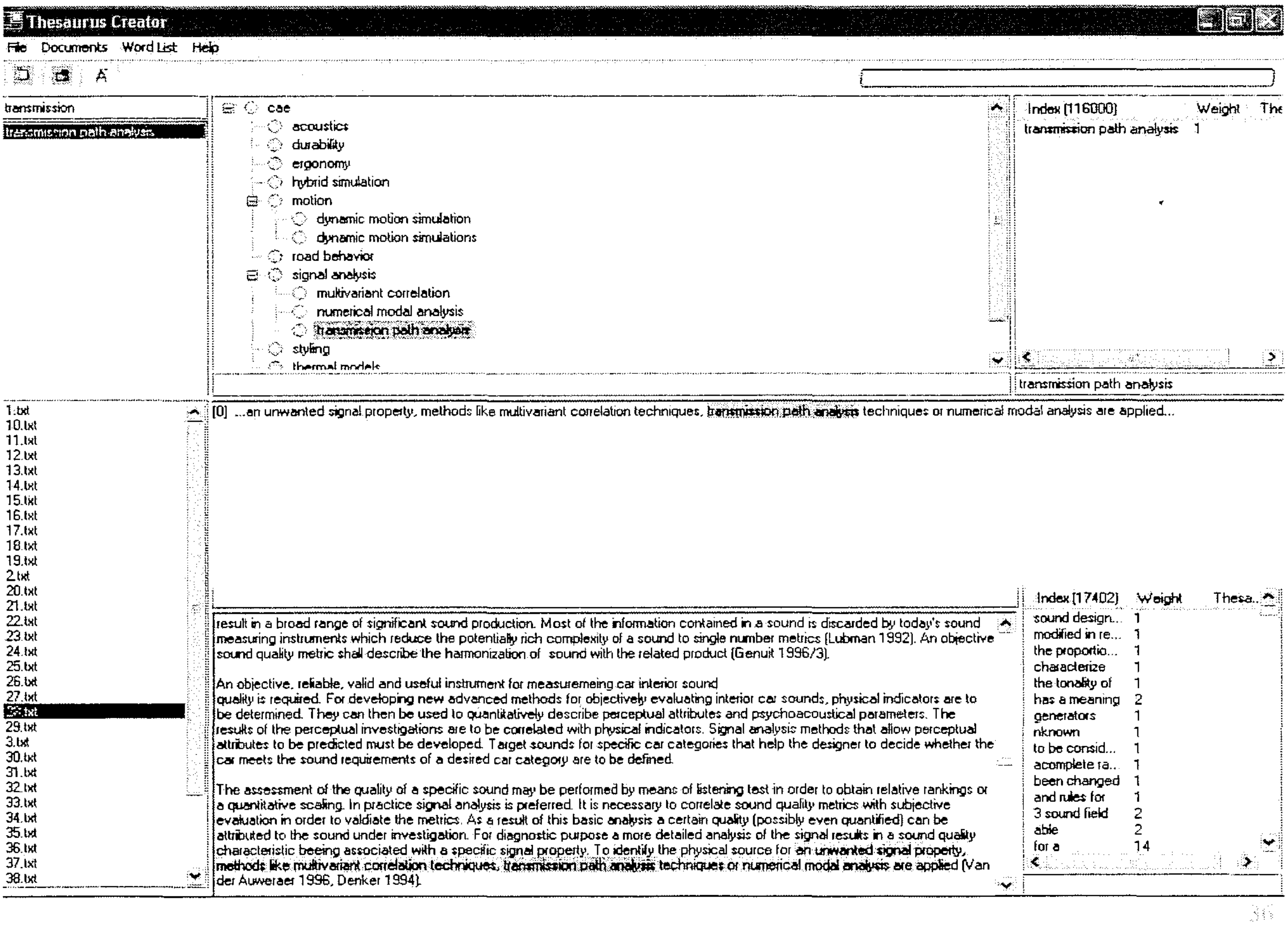
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transmission

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and rules for	1	
3 sound field	2	
able	2	
for a	14	

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1 Thesaurus Viewing

- Tree browsing – relations viewing
- List searching
- Concordance (single and multiple)
- Scope Notes viewing
- ISO script viewing

2 Thesaurus Editing

- Add / rename / delete related terms (BT/NT/RT/U/UF)
- Add / rename / delete Scope Note
- ISO script import

3 Thesaurus Export

- Html
- XML

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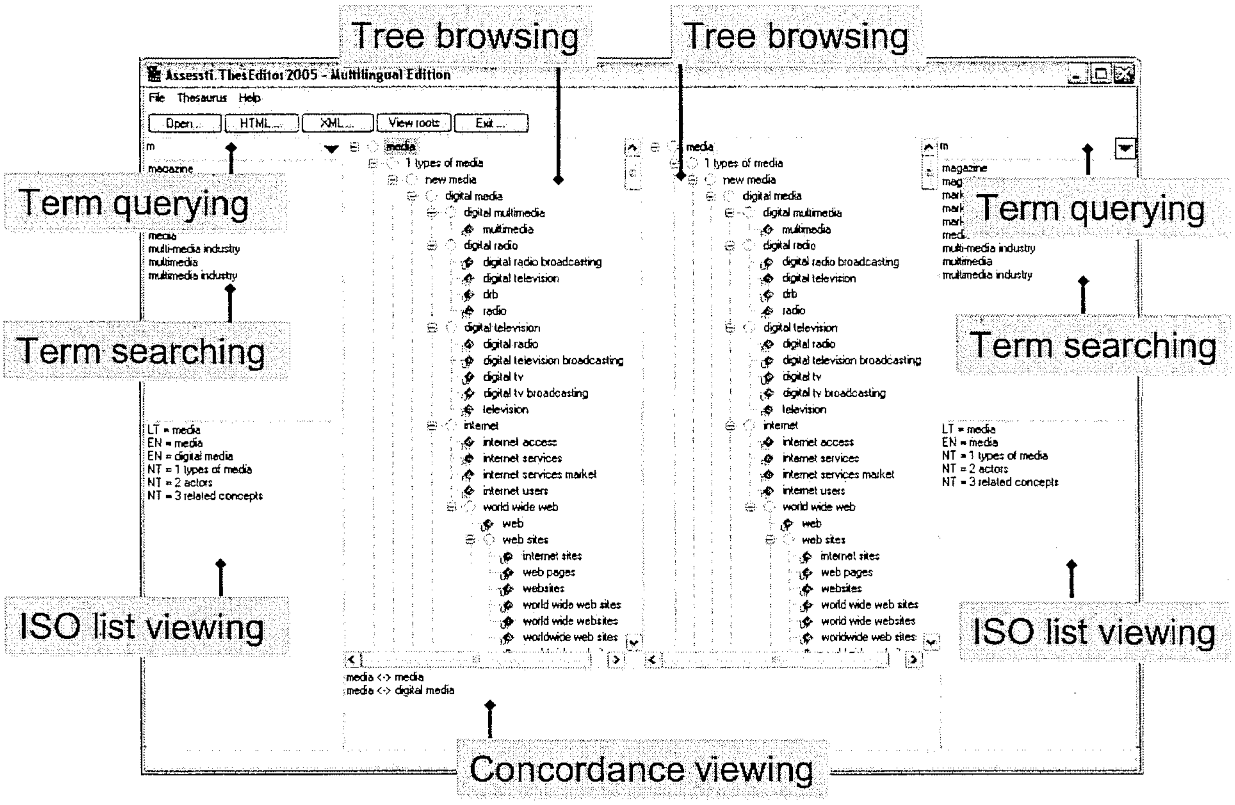
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Tree browsing

Tree browsing

Term querying

Term searching

ISO list viewing

Term querying

Term searching

ISO list viewing

Concordance viewing

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magazine

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multi-media industry
multimedia
multimedia industry

LT = media
EN = media
EN = digital media
NT = 1 types of media
NT = 2 actors
NT = 3 related concepts

LT = media
EN = media
NT = 1 types of media
NT = 2 actors
NT = 3 related concepts

media <-> media
media <-> digital media

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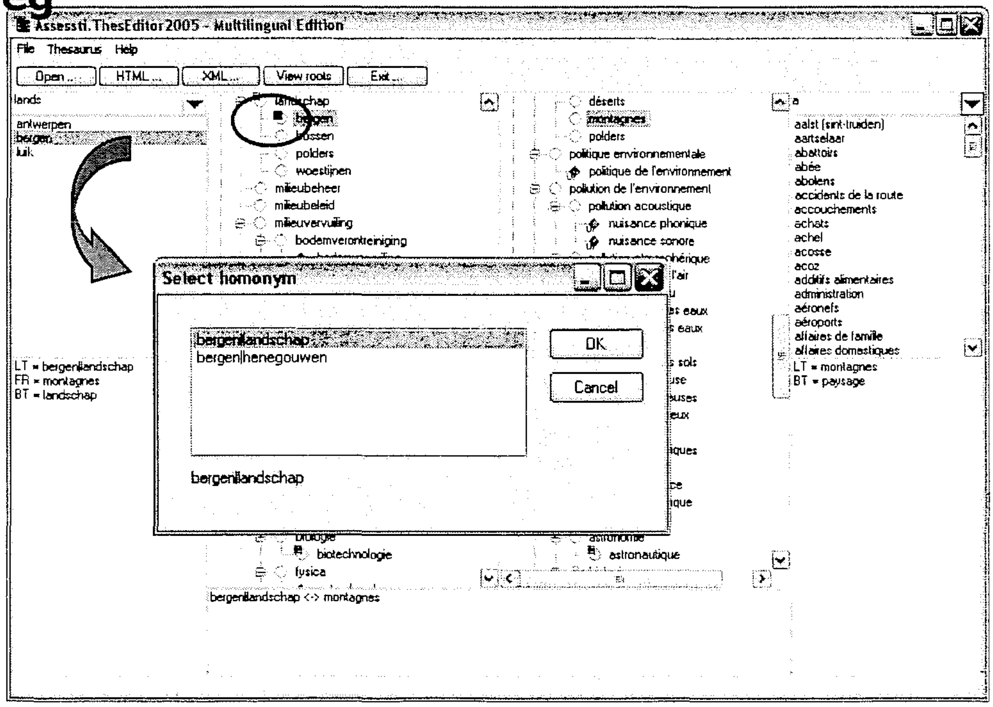
Homonymy resolution eg

bergen (NL) – montagnes (FR)
bergen (NL) – mons (FR)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montagnes
polders
politique environnementale
politique de l'environnement
pollution de l'environnement
pollution acoustique
nuisance phonique
nuisance sonore
astronomie
astronautique
Select homonym
OK
Cancel

lands

antwerpen
bergen
luik

bergen|landschap
bergen|henegouwen

bergen|landschap

LT = bergen|landschap
FR = montagnes
BT = landschap

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aalst (sint-truiden)
aartselaar
abattoirs
abée
abolens
accidents de la route
accouchements
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achel
acosse
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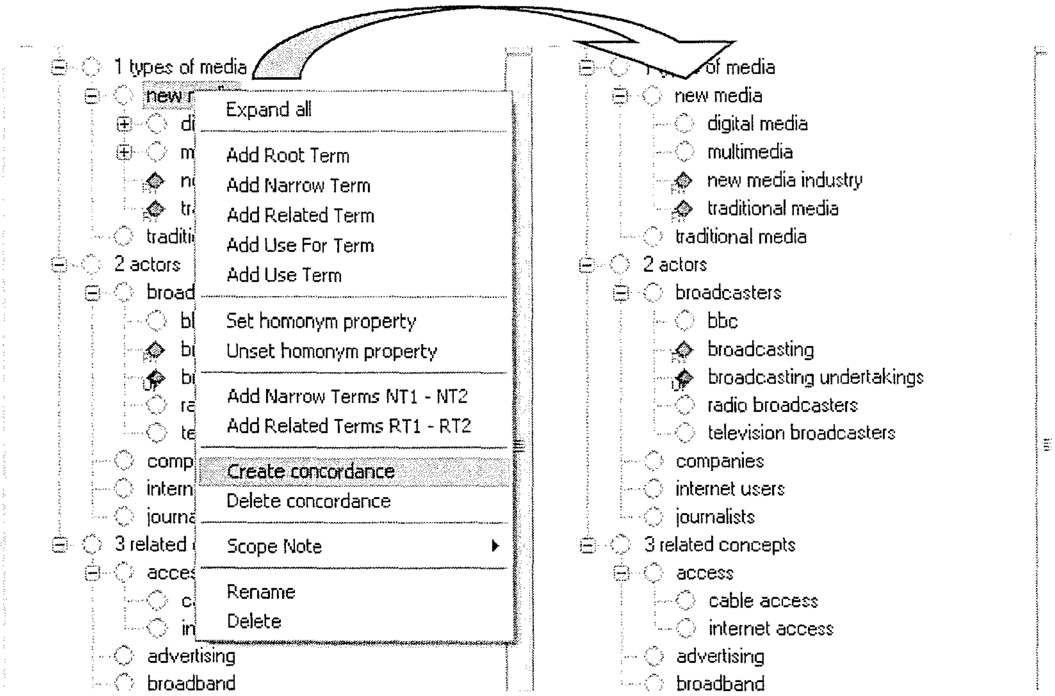
additifs alimentaires
administration
aéronefs
aéroports
affaires de famille
affaires domestiques

LT = montagnes
BT = paysage

bergen|landschap <-> montagnes

Concordance processing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journalists
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advertising
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Add Related Term
Add Use For Term
Add Use Term
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Add Narrow Terms NT1 - NT2
Add Related Terms RT1 - RT2
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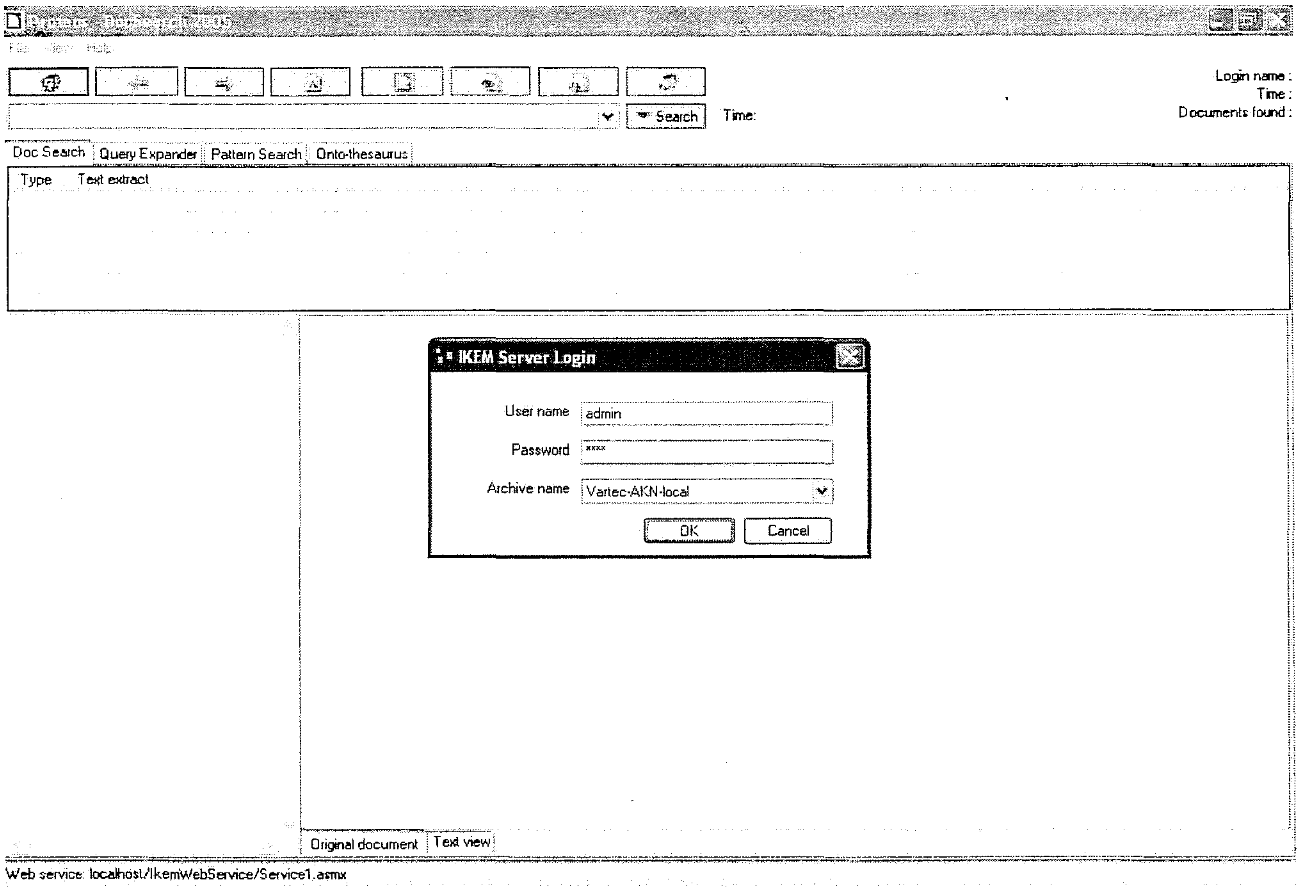
Onto-thesaurus application

Searching a document library of train maintenance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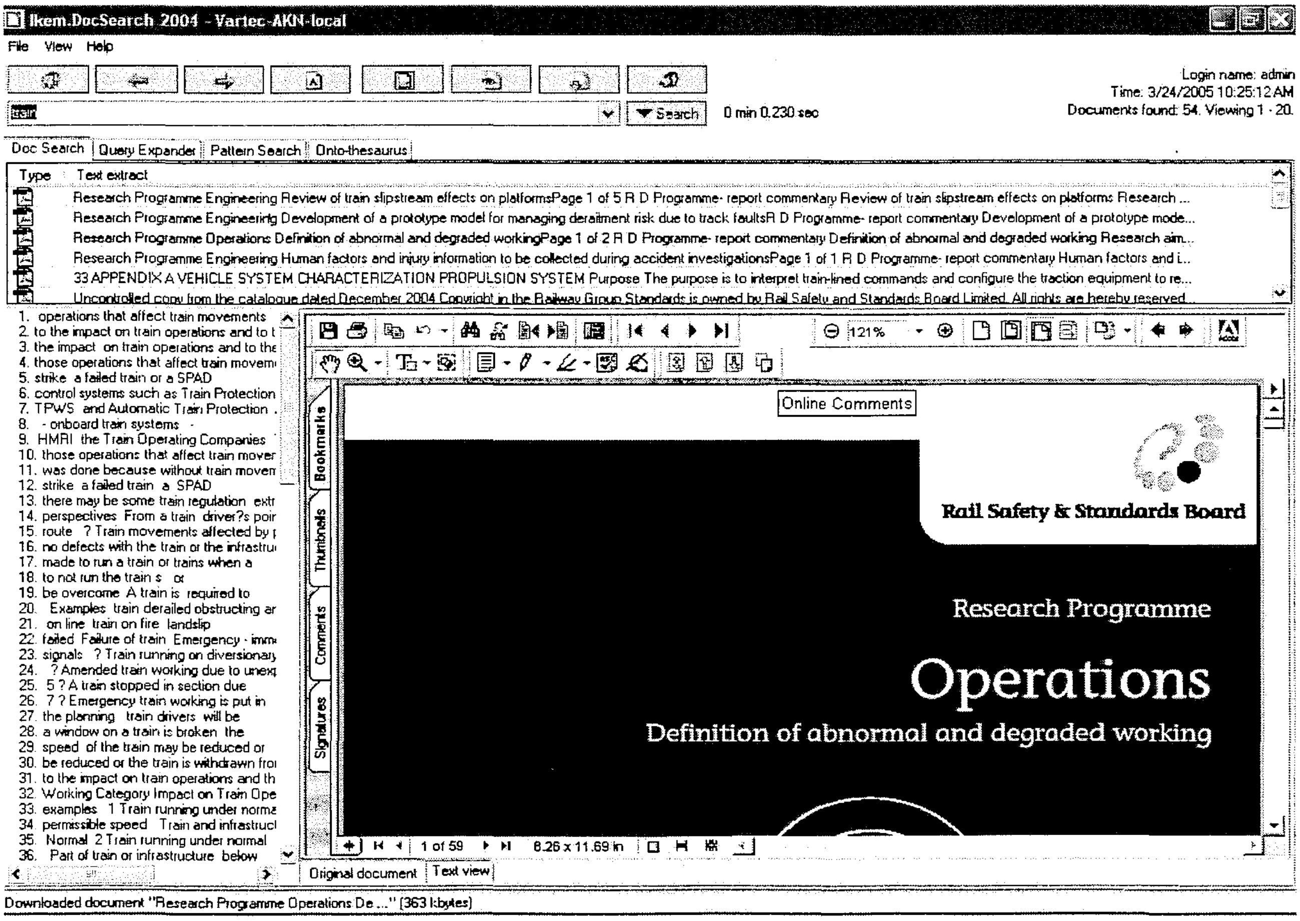
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19. be overcome A train is required to
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23. signals ? Train running on diversionar
24. ? Amended train working due to unex
25. 5 ? A train stopped in section due
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29. speed of the train may be reduced or
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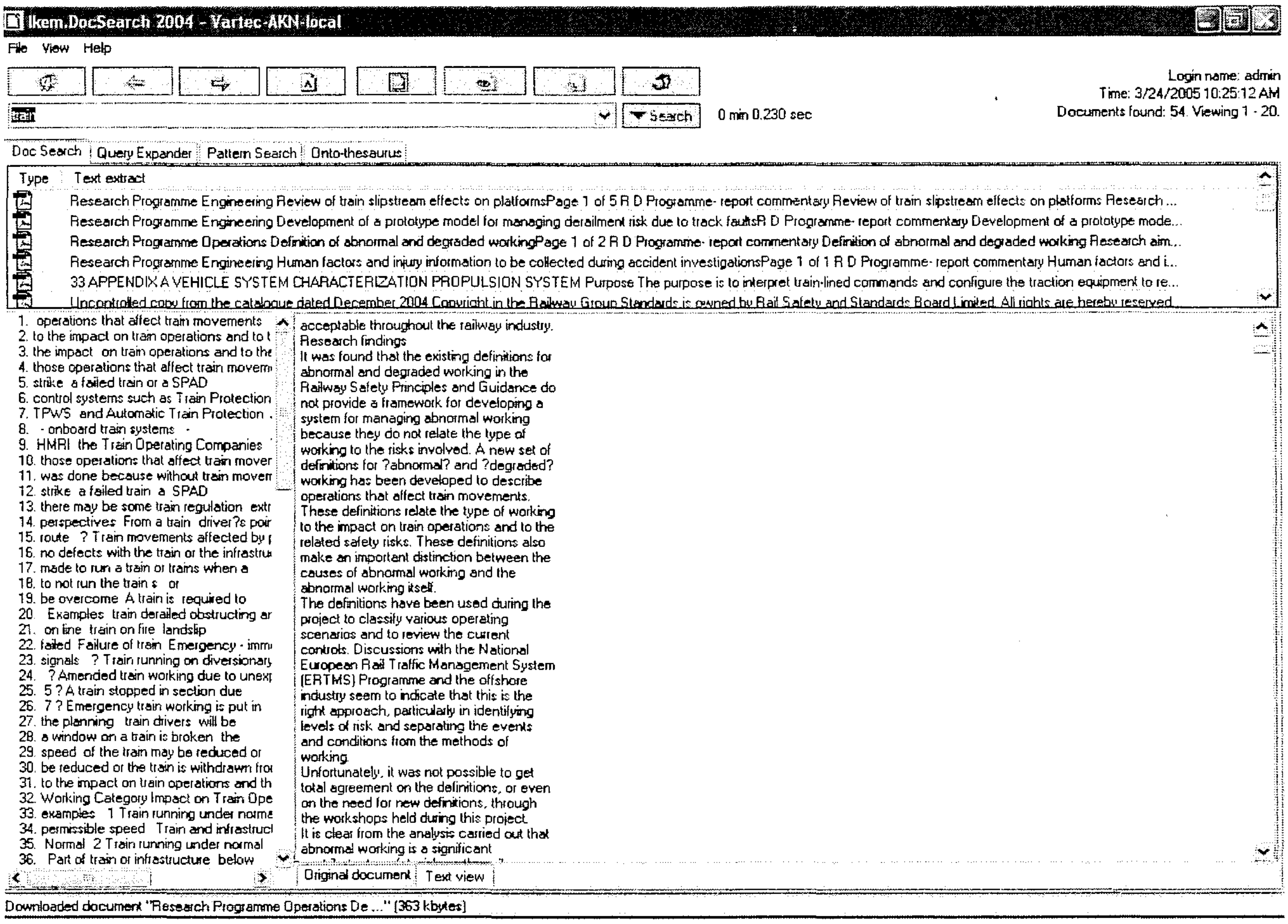

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34. permissible speed Train and infrastruct
35. Normal 2 Train running under normal
36. Part of train or infrastructure below

acceptable throughout the railway industry.
Research findings
It was found that the existing definitions for abnormal and degraded working in the Railway Safety Principles and Guidance do not provide a framework for developing a system for managing abnormal working because they do not relate the type of working to the risks involved. A new set of definitions for ?abnormal? and ?degraded? working has been developed to describe operations that affect train movements.
These definitions relate the type of working to the impact on train operations and to the related safety risks. These definitions also make an important distinction between the causes of abnormal working and the abnormal working itself.
The definitions have been used during the project to classify various operating scenarios and to review the current controls. Discussions with the National European Rail Traffic Management System (ERTMS) Programme and the offshore industry seem to indicate that this is the right approach, particularly in identifying levels of risk and separating the events and conditions from the methods of working.
Unfortunately, it was not possible to get total agreement on the definitions, or even on the need for new definitions, through the workshops held during this project.
It is clear from the analysis carried out that abnormal working is a significant

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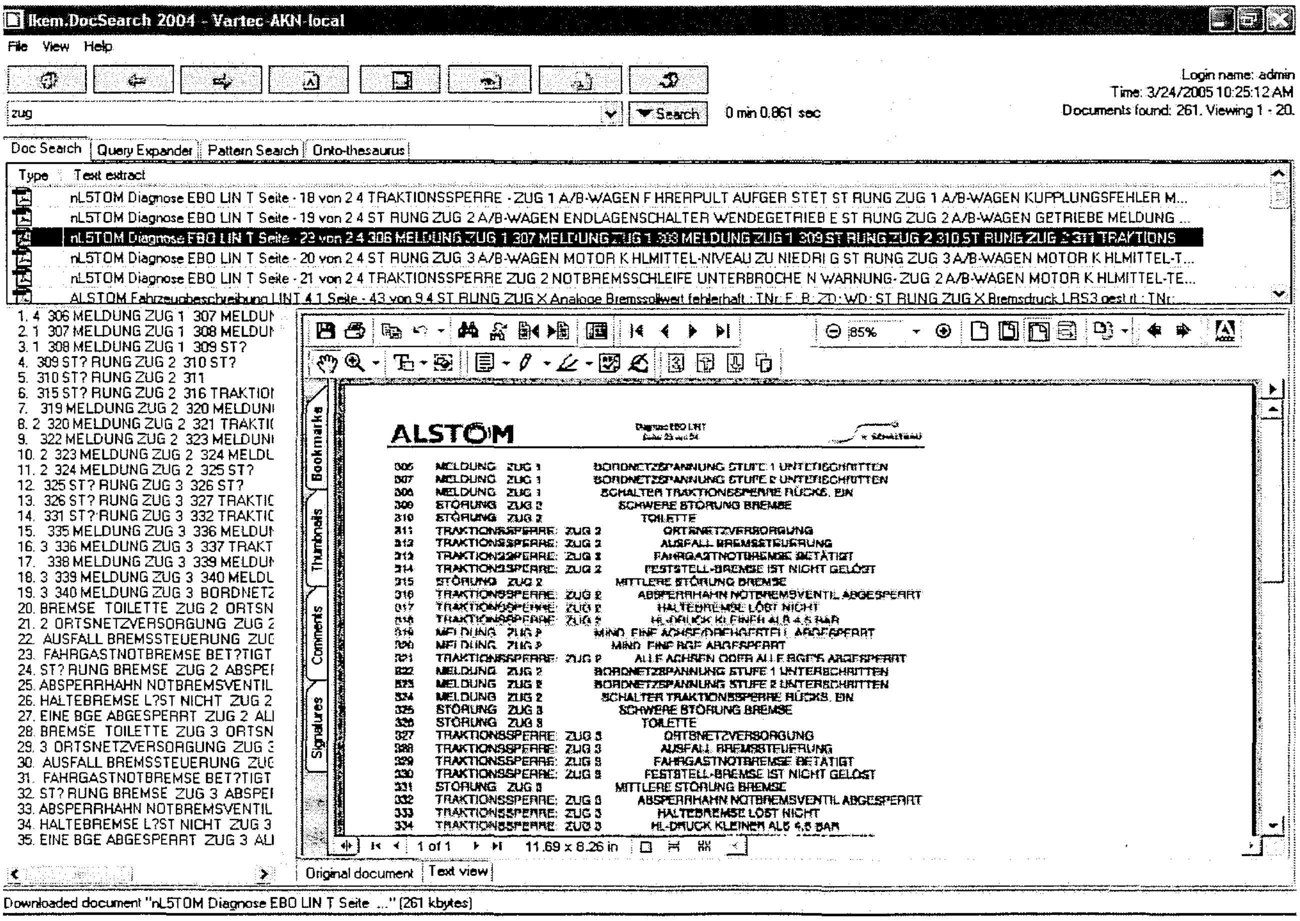

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24. ST? RUNG BREMSE ZUG 2 ABSPER
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310	STÖRUNG	ZUG 2	TOILETTE
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315	STÖRUNG	ZUG 2	MITTLERE STÖRUNG BREMSE
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317	TRAKTIONSSPERRE:	ZUG 2	HALTEBREMSE LÖST NICHT
318	TRAKTIONSSPERRE:	ZUG 2	HL-DRUCK KLEINER ALS 4,5 BAR
319	MELDUNG	ZUG 2	MIND. EINE ACHSE/DREHGESTELL ABGESPERRT
320	MELDUNG	ZUG 2	MIND. EINE BGE ABGESPERRT
321	TRAKTIONSSPERRE:	ZUG 2	ALLE ACHSEN ODER ALLE BGE'S ABGESPERRT
322	MELDUNG	ZUG 2	BORDNETZSPANNUNG STUFE 1 UNTERSCHRITTEN
323	MELDUNG	ZUG 2	BORDNETZSPANNUNG STUFE 2 UNTERSCHRITTEN
324	MELDUNG	ZUG 2	SCHALTER TRAKTIONSSPERRE RÜCKS. EIN
325	STÖRUNG	ZUG 3	SCHWERE STÖRUNG BREMSE
326	STÖRUNG	ZUG 3	TOILETTE
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329	TRAKTIONSSPERRE:	ZUG 3	FAHRGASTNOTBREMSE BETÄTIGT
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331	STÖRUNG	ZUG 3	MITTLERE STÖRUNG BREMSE
332	TRAKTIONSSPERRE:	ZUG 3	ABSPERRHAHN NOTBREMSVENTIL ABGESPERRT
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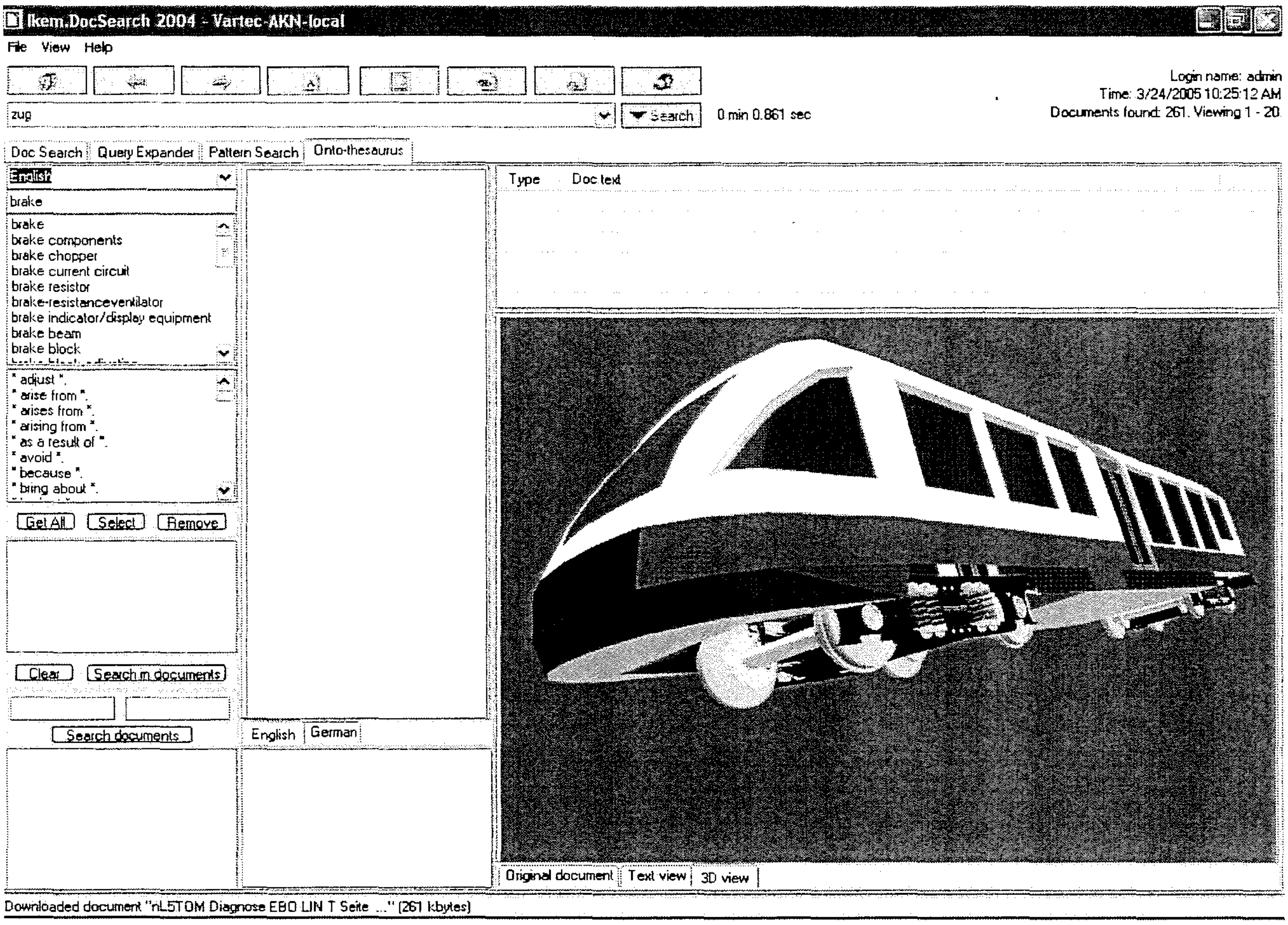
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brake resistor
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brake indicator/display equipment
brake beam
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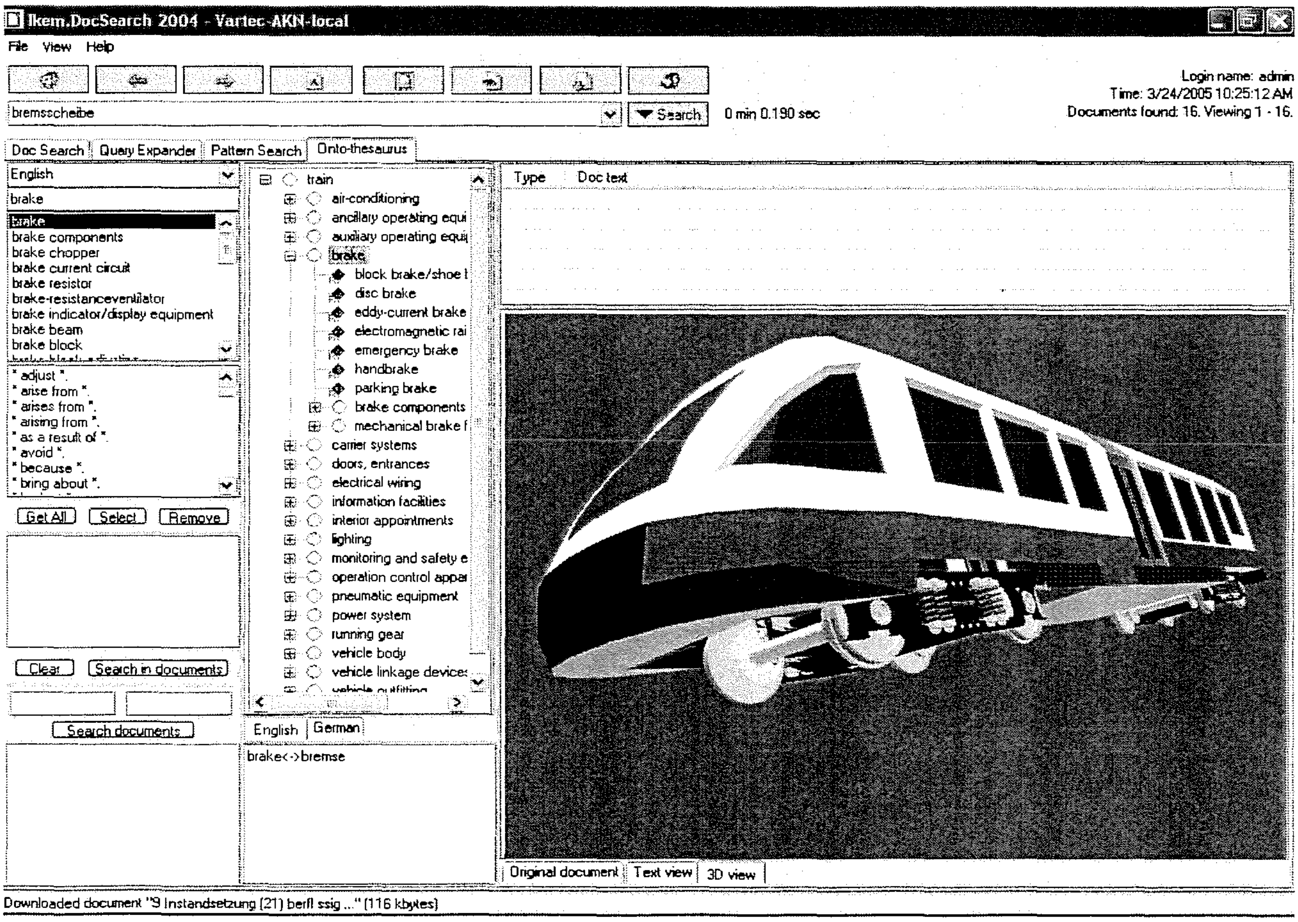
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  - power system
  - running gear
  - vehicle body
  - vehicle linkage device
  - vehicle outfitting

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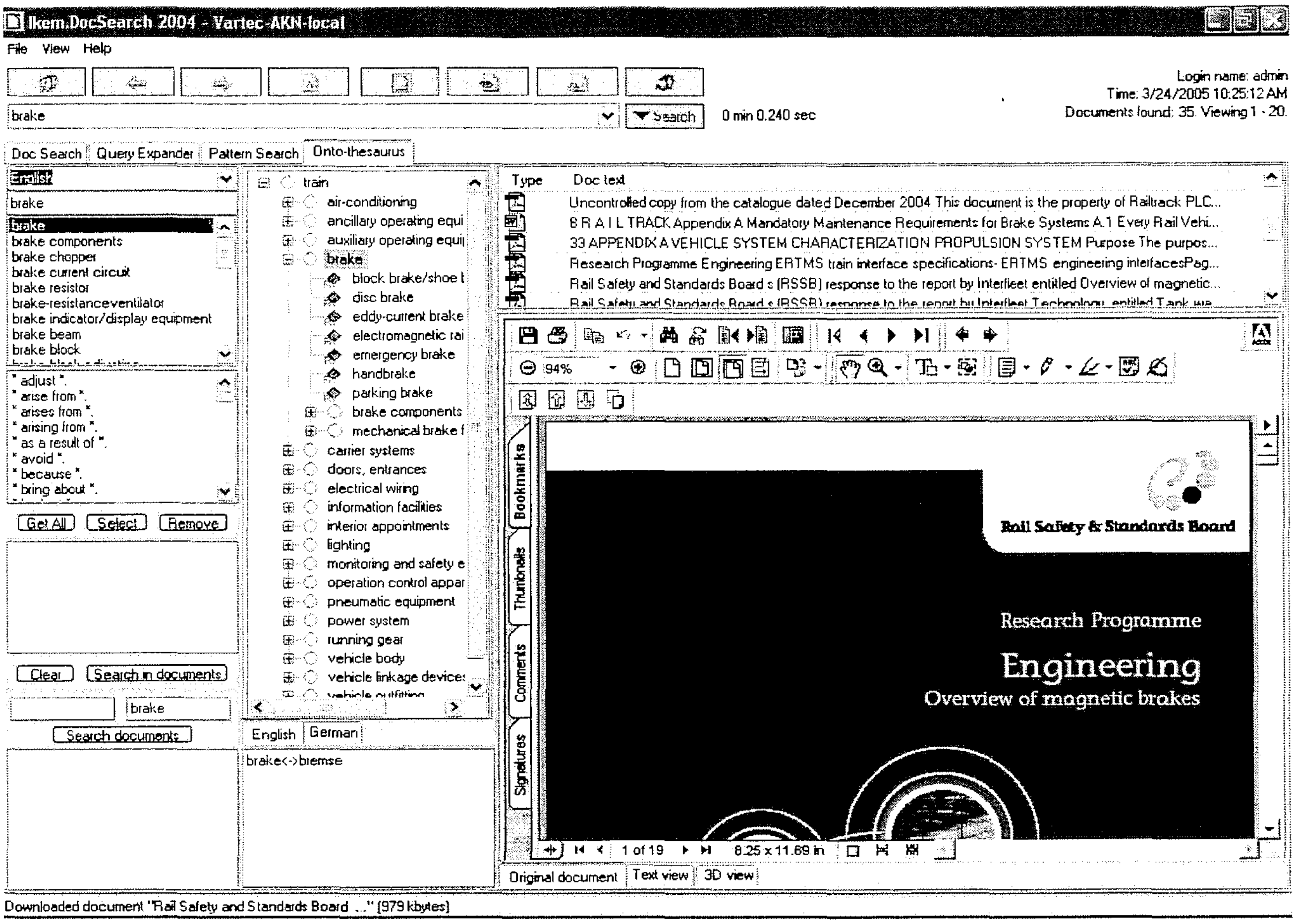
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B R A I L TRACK Appendix A Mandatory Maintenance Requirements for Brake Systems A.1 Every Rail Vehi...
33 APPENDIX A VEHICLE SYSTEM CHARACTERIZATION PROPULSION SYSTEM Purpose The purpos...
Research Programme Engineering ERTMS train interface specifications- ERTMS engineering interfacesPag...
Rail Safety and Standards Board s (RSSB) response to the report by Interfleet entitled Overview of magnetic...

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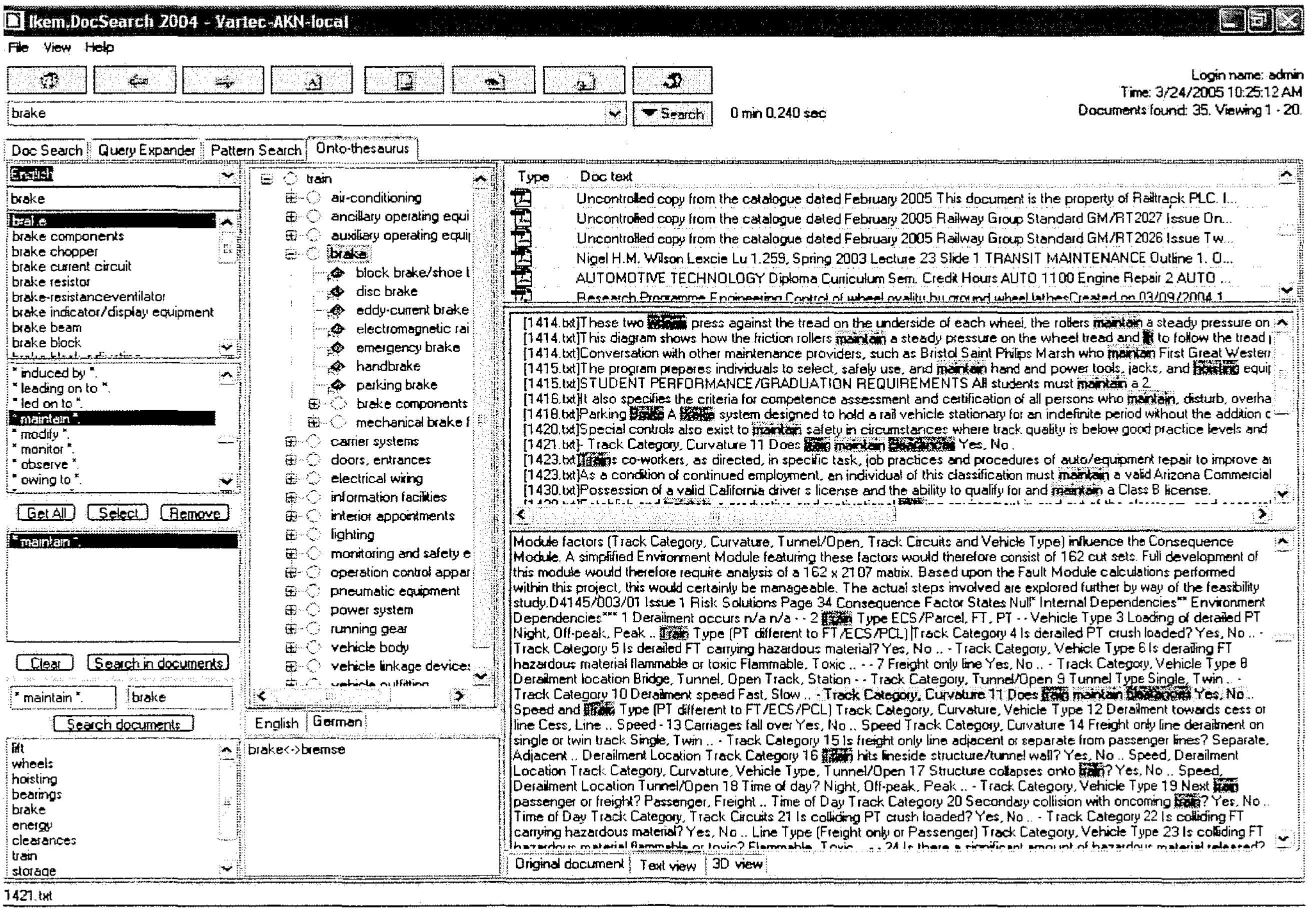
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Uncontrolled copy from the catalogue dated February 2005 Railway Group Standard GM/RT2027 Issue On...
Uncontrolled copy from the catalogue dated February 2005 Railway Group Standard GM/RT2026 Issue Tw...
Nigel H.M. Wilson Lexcie Lu 1.259, Spring 2003 Lecture 23 Slide 1 TRANSIT MAINTENANCE Outline 1. O...
AUTOMOTIVE TECHNOLOGY Diploma Curriculum Sem. Credit Hours AUTO 1100 Engine Repair 2 AUTO ...

[1414.txt]These two wheels press against the tread on the underside of each wheel, the rollers maintain a steady pressure on
[1414.txt]This diagram shows how the friction rollers maintain a steady pressure on the wheel tread and lift to follow the tread
[1414.txt]Conversation with other maintenance providers, such as Bristol Saint Philips Marsh who maintain First Great Westen
[1415.txt]The program prepares individuals to select, safely use, and maintain hand and power tools, jacks, and hoisting equi
[1415.txt]STUDENT PERFORMANCE/GRADUATION REQUIREMENTS All students must maintain a 2.
[1416.txt]It also specifies the criteria for competence assessment and certification of all persons who maintain, disturb, overha
[1418.txt]Parking brake A brake system designed to hold a rail vehicle stationary for an indefinite period without the addition c
[1420.txt]Special controls also exist to maintain safety in circumstances where track quality is below good practice levels and
[1421.txt]- Track Category, Curvature 11 Does train maintain clearances Yes, No .
[1423.txt]Trains co-workers, as directed, in specific task, job practices and procedures of auto/equipment repair to improve a
[1423.txt]As a condition of continued employment, an individual of this classification must maintain a valid Arizona Commercial
[1430.txt]Possession of a valid California driver s license and the ability to qualify for and maintain a Class B license.

Module factors (Track Category, Curvature, Tunnel/Open, Track Circuits and Vehicle Type) influence the Consequence Module. A simplified Environment Module featuring these factors would therefore consist of 162 cut sets. Full development of this module would therefore require analysis of a 162 x 2107 matrix. Based upon the Fault Module calculations performed within this project, this would certainly be manageable. The actual steps involved are explored further by way of the feasibility study.D4145/003/01 Issue 1 Risk Solutions Page 34 Consequence Factor States Null* Internal Dependencies** Environment Dependencies*** 1 Derailment occurs n/a n/a - - 2 Train Type ECS/Parcel, FT, PT - - Vehicle Type 3 Loading of derailed PT Night, Off-peak, Peak .. Train Type (PT different to FT/ECS/PCL) Track Category 4 Is derailed PT crush loaded? Yes, No .. - Track Category 5 Is derailed FT carrying hazardous material? Yes, No .. - Track Category, Vehicle Type 6 Is derailing FT hazardous material flammable or toxic Flammable, Toxic .. - - 7 Freight only line Yes, No .. - Track Category, Vehicle Type 8 Derailment location Bridge, Tunnel, Open Track, Station - - Track Category, Tunnel/Open 9 Tunnel Type Single, Twin .. - Track Category 10 Derailment speed Fast, Slow .. - Track Category, Curvature 11 Does train maintain clearances Yes, No .. Speed and Train Type (PT different to FT/ECS/PCL) Track Category, Curvature, Vehicle Type 12 Derailment towards cess or line Cess, Line .. Speed - 13 Carriages fall over Yes, No .. Speed Track Category, Curvature 14 Freight only line derailment on single or twin track Single, Twin .. - Track Category 15 Is freight only line adjacent or separate from passenger lines? Separate, Adjacent .. Derailment Location Track Category 16 Train hits lineside structure/tunnel wall? Yes, No .. Speed, Derailment Location Track Category, Curvature, Vehicle Type, Tunnel/Open 17 Structure collapses onto train? Yes, No .. Speed, Derailment Location Tunnel/Open 18 Time of day? Night, Off-peak, Peak .. - Track Category, Vehicle Type 19 Next train passenger or freight? Passenger, Freight .. Time of Day Track Category 20 Secondary collision with oncoming train? Yes, No .. Time of Day Track Category, Track Circuits 21 Is colliding PT crush loaded? Yes, No .. - Track Category 22 Is colliding FT carrying hazardous material? Yes, No .. Line Type (Freight only or Passenger) Track Category, Vehicle Type 23 Is colliding FT