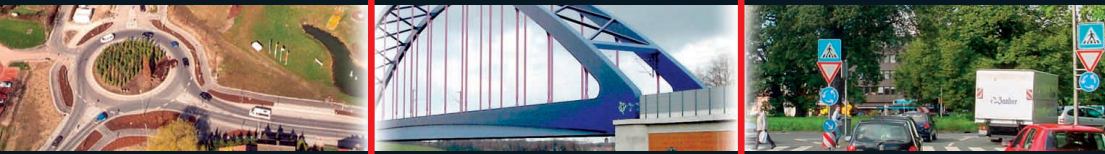# ti|fo|sy ®

Civil Engineering Information System

Roads Database
Project Management
Structures Register
Green Spaces Register

„Doppik" in the Public
Works Department

nts
Ingenieurgesellschaft mbH

Experience pays

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"nts" with head offices in Münster was founded on 1 July 1970. Ingenieurgesellschaft nts mbH evolved from this firm on 11 October 1988 and is now managed by the second generation. Other branch offices exist in Halle/ Saale and Falkensee near Berlin.

The broad experience which characterises our services results from this activity over more than 35 years in all areas of planning & design and civil engineering as well as close cooperation with a large number of municipal administrations.

Our team of approx. 60 employees is made up of civil & construction engineers, surveying engineers, geographers, business experts and programmers. We are therefore able to develop all our products to be particularly practical and user-friendly.

Continuous development of **tifosy**® for our clients is supplemented by other services which round off our firm's range of offers:

- Adoption of existing databases
- Training
- Installation
- Local data acquisition
- Data maintenance
- Structural surveys

Through close cooperation with different specialist firms we are also able to offer CCTV inspections, video analyses, georadar, etc.

Roads Database

Project Management

Structures Register

Green Spaces Register

Civil Engineering Information System

Philosophy

- Forward-looking through „Doppik"* complete costs control
- Practical development
- Clarity through menus and tabs technique
- Integration of all areas in one system
- Individual due to flexible selection fields
- Faulty work is prevented by
  - Information flow across all levels
  - Clear definition of responsibilities
  - Time scheduling control
- Minimum data acquisition costs through logical linking of historicized tables with flexible degree of detail

*) Doppik = Doppelte Buchführung in Konten
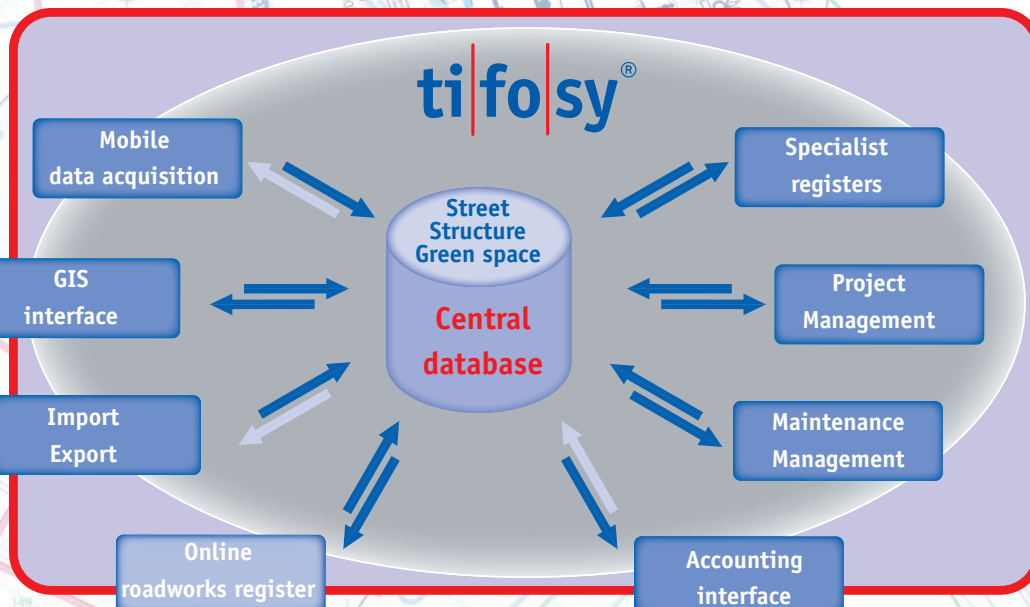(Double-Entry Bookkeeping in Accounts)

Modular system

- Basic modules: roads, structures and green space register
- Other modules can be enabled at any time without additional installation costs
- External GIS connection is optional
- Individually configurable workstations
- Interface for different accounting systems

Integrated

- Valuation using various methods for the „Doppik"
- Employee management
- Access control
- Document filing
- Company directory

Networked structures

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Mobile data acquisition

Specialist registers

Street Structure Green space

Central database

GIS interface

Project Management

Import Export

Maintenance Management

Online roadworks register

Accounting interface

Roads Database

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Manage existing stocks - plan maintenance

The roads database system is based on the „Guidelines for the planning of road surfacing maintenance measures" (RPE-Stra 01), the recommendations for local town street maintenance management (EEM-I) and the Roads Information Bank Instruction ASB.

tifosy® is a scaleable, open system, in which a common database is maintained as the reference for all other modules. It is based on the roads network in the form of a nodes-edges model.

As a result, in a first step dedications, accountabilities, classifications, etc. can be recorded to minimise incorrect work during the on-site data acquisition (e.g. by inadvertently measuring private roads). Diverse other information can be added to this basic database.

It is important to record the basic data so that it can be made available for other uses in the future. The costs incurred for the data acquisition can pay off within a short time if the data is processed so that a maintenance management system can be set up and therefore misdirected investments are avoided.

Roads register

- Clear presentation of all road network master data
- Recording of the public traffic areas to a variable extent, from the standard road-cross-section through to chainage data and digitised surfaces
  - Geometry
  - Pavement construction
  - Condition
- Possibility of accurate track representation and visualisation of cross-sections at free chainages
- Traffic loads
- Stop furniture and features
- Photo documentation
- Valuation
- Drainage
- Stationary traffic
- Dedications
- Building numbers

The following have been taken into account:
- Roads Information Bank Instruction ASB
- Guidelines for the planning of road surfacing maintenance measures (RPE-Stra 1)
- Working papers on the road maintenance system (AP9 FGSV)
- Recommendations for local town street maintenance management (E-EMI 2003)

Solid database - reliable planning basis

Route inspections

- Documentation of regular road inspections
- Recording of all defects and the materials required
- Automatic data flow between the public works department and roads depot including roadworks register and special uses
- Allocation of damage to completed activities
- Hardware support for cameras, GPS and voice recordings
- Interface with mobile GIS for simple positioning and recording of new activities
- Evaluation of the damage for maintenance management

Initial economic data acquisition

- Data acquisition tools for geometries, condition values, signage and street furniture
- Visualisation of the recorded data on site for optimum quality assurance
- Import tools for numerous GIS and CAD systems for inclusion of as-built plans and aerial photography evaluations

Maintenance management

- Determination of requirements divided into practical, in use value and intrinsic value
- Strategies for pursuing objectives:
  - Budget optimisation according to in use value
  - Budget optimisation according to intrinsic value
  - Maintenance of a specific level
- Variable combinations of measures and price catalogues

- Weighting by:
  - Type of traffic area
  - Type of urban road
  - Local public transport usage
  - Priority areas
- Direct coupling with project management and the roads inspection log

By linking with the asset accounting the residual values of the assets are taken into account as additional costs (special write-offs) at the time of renewal.

In the event of fundamental renewals, income can be credited to the expenditure as special items to be amortized. The scope of the necessary structural maintenance is included in the calculation on the basis of damage frequency (wear of surfaces) from the roads inspection log.

Roads Database

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Manage, Inspect, Approve

With **tifosy**®, roadworks can be tracked from the time they are reported through to the end of the warranty period. Pre-defined queries are used to generate lists for the roads surveyor including the individual roadworks, including the party responsible, contractor and contact. By linking with the roads database, a large amount of information is available to the user.

Various additional modules are available for road management. E.g. databases can be maintained for signage (location, date erected, traffic regulation orders, etc.), street furniture or lighting (e.g. location, type of mast, light mounting height, lamp, date changed, etc.).

Roadworks register

- Direct allocation of roadworks to the geometry
- Link with roads register and project management
- Management of the public utilities, contractors, etc.
- Monitoring the warranties
- Documentation of the roadworks for maintenance planning
- Traffic regulation orders
- Diversions
- Conflict analysis

Web roadworks

- Online access for public utilities
- Handling the whole process
- Coordination management
- Coupling with municipal web GIS
- Manual entry by the local authorities no longer necessary

Clarity in public space

Lighting register

- Documentation of all lighting installations (switch-points, masts, lights, lamps)
- Planning and documentation of maintenance and repairs
- Valuation
- Billing lighting costs for third parties

Traffic lights register

- Documentation of all traffic lights
- Monitoring of tests and inspections in accordance with VDE 0832
- Fault reports
- Damage documentation
- Valuation

Signage register

- Catalogue of all traffic signs
  - Completely vector-based, usable for other applications
  - Over 800 traffic signs from all road traffic areas
  - VwV-StVO (road regulations) integrated
- Graphic documentation
- Traffic regulation orders
- Recording of road condition
- Damage documentation
- Valuation

Street furniture

- Free catalogue of street equipment and furniture
- Management of manufacturer's instructions, information and prices
- Recording of road condition
- Coupling with the roads register is possible

Structures Green spaces

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Maintenance, Inspection, Monitoring

tifosy® enables the management of all structures for which a local authority is responsible, including noise bunds, retaining walls, traffic sign gantries, troughs, tunnels and other structures. The master data is matched to the needs of the local administration and are coupled with the roads database. The data includes the over or under passing sections of the traffic routes from the roads database as well as the main coordinates. In this way, e.g. the graphic output in any GIS, queries for heavy transport routes, etc. are possible.

By forming structure sections, even complex structures with changing constructions can be clearly managed. Noise control walls on bridges, retaining walls at bridges, etc. can be grouped together.

Costs incurred, special features in inspections and regular maintenance measures are clearly documented.

Structures Register

• Structures directory for documenting all relevant parts of structures
• Cost control
• Structure-dependent definition of checklists
• Planning, performance and documentation of inspections
• Detailed damage documentation with priority and cost estimate
• Inspection reports
• Budget/costs planning
• Implementation in accordance with:
  - Guidelines on the uniform data acquisition, assessment, recording and evaluation of structural survey and inspection results (RI-EBW-PRÜF)
  - DIN 1076
  - Roads Information Bank Instruction ASB

Record existing stocks - maintain values

Green space maintenance register

- Documentation of all maintenance units
- Coupling with the roads register for easy and clear management of roadside planting
- Valuation
- Grouping of maintenance units and district administration
- Estimating the maintenance work and costs
- Differentiation into 2-D surface, linear and punctiform maintenance objects

Trees register

- Planning, performance and documentation of inspections
- Coupling with plants catalogues
- Use of maintenance areas as tree locations
- Depositing all detailed data
- Historicization of the location information
- Sponsorships
- Mobile tree inspections using pocket PCs

Playgrounds register

- Planning, performance and documentation of inspections
- Management of manufacturer's instructions, information and prices
- Complete documentation of the playground equipment
- Avoidance of redundant data by linking with the objects of the green space maintenance register

# Evaluation Continuation

tifosy®

Sustainably plan cost control

In **tifosy**® the data for the „Doppik" evaluation are maintained in the form of assets accounting with annual write-offs, additions and disposals. Intelligent algorithms enable the automatic supplementing of incomplete information. Adjustable options can be used to group similar assets into a single asset item.

The data update begins with the opening balance sheet. The large number of specialist local authority offices and agencies involved requires close interlinking of the sub-processes to enable current changes to be reliably managed through to asset accounting.

tifosy® unites the technical requirements of civil engineering with the accounting standards of the financial department in the project management module.

Changes to the structural substance are managed just as much as the corresponding cash flow. In this way, continuously updated data is available to both the accounts department and the specialist agency.

By differentiating the construction projects into costs to be capitalised and current costs/overheads, into in-house administrative completion and external contract award as well as the calculation of partial depreciation and write-offs the assets updates in the accounts can be directly generated from the project management.
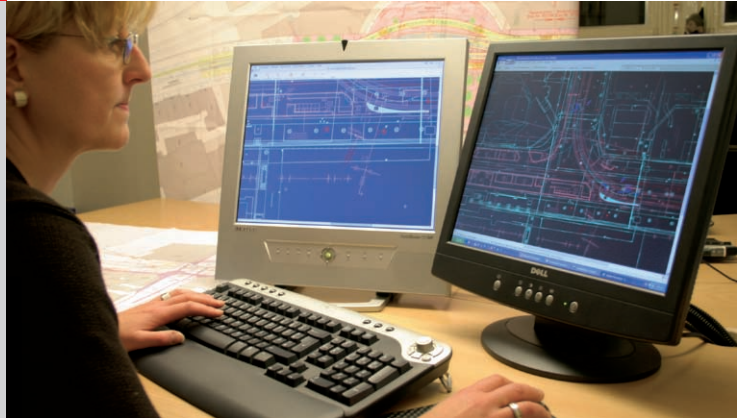
„Doppik" evaluation

- Integrated plausibility checks for completeness and logical relationship
- Automatic addition of missing data by means of environmental comparison
- Optional adoption of the construction years from deposited layers, geometries or condition
- Determination of the construction years if entry is missing by means of field comparisons
- Supplements and/or deductions are taken into account if condition data differs from year of construction
- Planning and design costs shown separately as expenditure not eligible for grants or subsidies
- Optional valuation according to new value or present value
- Lump sum of supplements taken into account for lighting, drainage, signage, roadside planting, street furniture
- Acquisition cost (net cash outflow) and present value following depreciation shown for revenues too
- Different asset summary options for transfer to the accounting department
- Optional update of the assets file in **tifosy**® or in the assets accounting with regular data synchronisation
- Depiction of the assets file in the respective specialist register
- Extensive evaluations from the assets file
- Automatic data transfer to the accounting department

Transparency
in complex projects

Project Management

- Complete documentation of all construction projects in a digital construction file
- Differentiation into future planned and current projects
- Differentiation of the construction projects into traffic (roads, green spaces, structures) and water engineering (sewers, bodies of water)
- Specification of planned construction start date and expected duration
- Input of new build, extension, renewal and maintenance projects
- Allocation of the construction projects to all objects/properties concerned
- Definition of the cost estimate for all trades concerned according to
  - Internal and external planning
  - Regular maintenance and costs to be capitalised
  - Internal and external construction supervision
- Management of the revenues according to charges and grants (including current processing status)
- Current planning status with depositing of detailed and general layout plans

- Awarding external consultant engineering services
- Documentation of parliamentary procedures with access to external council information systems
- Documentation of the whole construction process
  - The basis of tender and contract award
  - Submission/direct award
  - Contract award
  - Contract management including bonds and final invoice
- Construction project accounting
  - Management of interim payments
  - Handover of payment instructions, following proper checking by the responsible departments, to the accounting department, either as printout, eMail or file in accounting format
- Documentation of all construction completion works
- Generation of the necessary postings for updating the asset accounting

Wastewater disposal concept

- Planning and coordination of environmental/sanitary engineering measures
- Provision of the drawing data in the area covered by the project by coupling with the roads register
- Management of the water management justifications
- Automatic generation of reports for the ABK list
- Generation of the annual verifications of changes to be submitted

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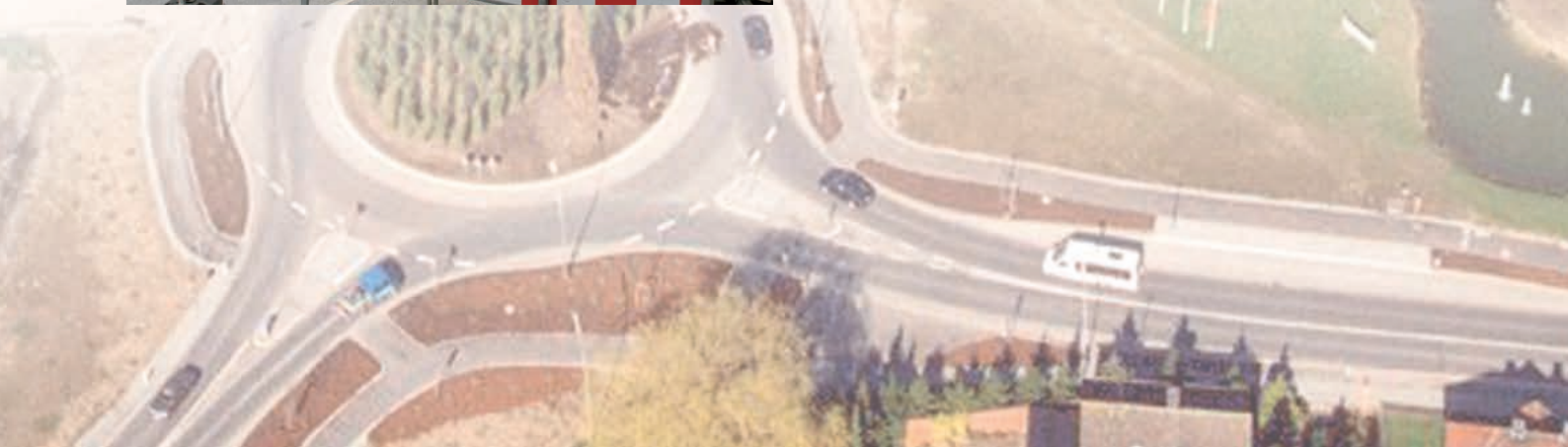
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