4. Calculation, material, work rates and services.

Clusters, clusters_artikelen, calculaties:

```
bisystem=# \d clusters
                        Table "public.clusters"
    Column     |         Type          | Collation | Nullable |        Default
---------------+-----------------------+-----------+----------+-----------------------
 clusterID     | character varying(7)  |           | not null |
 omschrijving  | character varying(45) |           |          |
 prijs         | double precision      |           |          | 0
 eenheid       | character varying(10) |           |          | ''::character varying
 materialen    | double precision      |           |          | 0
 lonen         | double precision      |           |          | 0
 diensten      | double precision      |           |          | 0
 materieel     | double precision      |           |          | 0
 inhuur        | double precision      |           |          | 0
 uren_constr   | double precision      |           |          | 0
 uren_mont     | double precision      |           |          | 0
 uren_retourlas | double precision     |           |          | 0
 uren_bfi      | double precision      |           |          | 0
 uren_voeding  | double precision      |           |          | 0
 uren_bvl      | double precision      |           |          | 0
 uren_spoorleg | double precision      |           |          | 0
 uren_spoorlas | double precision      |           |          | 0
 uren_inhuur   | double precision      |           |          | 0
 uren_telecom  | double precision      |           |          | 0
 sleuvengraver | double precision      |           |          | 0
 persapparaat  | double precision      |           |          | 0
 atlaskraan    | double precision      |           |          | 0
 kraan_groot   | double precision      |           |          | 0
 mainliner     | double precision      |           |          | 0
 hormachine    | double precision      |           |          | 0
 wagon         | double precision      |           |          | 0
 locomotor     | double precision      |           |          | 0
 locomotief    | double precision      |           |          | 0
 montagewagen  | double precision      |           |          | 0
 stormobiel    | double precision      |           |          | 0
 robeltrein    | double precision      |           |          | 0
Indexes:
    "clusters_pkey" PRIMARY KEY, btree ("clusterID")
Referenced by:
    TABLE "cluster_artikelen" CONSTRAINT "clusters_clusterID_fkey" FOREIGN KEY ("clusterID") REFERENCES clusters("clusterID")
```

```
bisystem=#  \d cluster_artikelen
                      Table "public.cluster_artikelen"
    Column     |         Type          | Collation | Nullable |        Default
---------------+-----------------------+-----------+----------+-----------------------
 cluster_artID | integer               |           | not null | 0
 artikelID     | integer               |           |          |
 hoeveelheid   | double precision      |           |          | 0
 clusterID     | character varying(7)  |           |          | ''::character varying
Indexes:
    "cluster_artikelen_pkey" PRIMARY KEY, btree ("cluster_artID")
Foreign-key constraints:
    "artikelen_artikelID_fkey" FOREIGN KEY ("artikelID") REFERENCES artikelen("artikelID")
    "clusters_clusterID_fkey" FOREIGN KEY ("clusterID") REFERENCES clusters("clusterID")
```

Above

```
bisystem=# \d calculaties
                        Table "public.calculaties"
      Column      |         Type          | Collation | Nullable |        Default
------------------+-----------------------+-----------+----------+-----------------------
 calcID           | integer               |           | not null | 0
 clusterID        | character varying(7)  |           |          | ''::character varying
 calculatie       | integer               |           |          | 0
 omschrijving     | character varying(50) |           |          | ''::character varying
 hoeveelheid      | double precision      |           |          | 0
 eenheid          | character varying(10) |           |          | ''::character varying
 prijs            | double precision      |           |          | 0
 koppelnummer     | integer               |           |          | 0
 materialen       | double precision      |           |          | 0
 lonen            | double precision      |           |          | 0
 diensten         | double precision      |           |          | 0
 materieel        | double precision      |           |          | 0
 inhuur           | double precision      |           |          | 0
 uren_constr      | double precision      |           |          | 0
 uren_mont        | double precision      |           |          | 0
 uren_retourlas   | double precision      |           |          | 0
 uren_bfi         | double precision      |           |          | 0
 uren_voeding     | double precision      |           |          | 0
 uren_bvl         | double precision      |           |          | 0
 uren_spoorleg    | double precision      |           |          | 0
 uren_spoorlas    | double precision      |           |          | 0
 uren_inhuur      | double precision      |           |          | 0
 huisvesting      | double precision      |           |          | 0
 overig           | double precision      |           |          | 0
 reisuren         | double precision      |           |          | 0
 uren_telecom     | double precision      |           |          | 0
 werkomschrijving | character varying(45) |           |          | ''::character varying
 sleuvengraver    | double precision      |           |          | 0
 persapparaat     | double precision      |           |          | 0
 atlaskraan       | double precision      |           |          | 0
 kraan_groot      | double precision      |           |          | 0
 mainliner        | double precision      |           |          | 0
 hormachine       | double precision      |           |          | 0
 wagon            | double precision      |           |          | 0
 locomotor        | double precision      |           |          | 0
 locomotief       | double precision      |           |          | 0
 montagewagen     | double precision      |           |          | 0
 stormobiel       | double precision      |           |          | 0
 robeltrein       | double precision      |           |          | 0
 verwerkt         | integer               |           |          | 0
 calculatiedatum  | character varying(10) |           |          | ''::character varying
Indexes:
    "calcID_pkey" PRIMARY KEY, btree ("calcID")
```

screenshots of the tables clusters cluster_artikelen and calculaties with its connections.

The base of the cluster calculation is the cluster.
The background of the cluster calculation is:
Fast calculation by products or working hours and services compiled by established collections.
The Icluster is a cluster that is made in the internal workplace and serves delivering to external works, via the warehouse item article number.
The external cluster is order-related creation.
We will explain the external cluster for the procedure of the internal cluster is likewise.
The cluster numbering structure has been established in the database and is adjustable with menu items 9 of Calculation works internally or Calculation works externally. Creating of a cluster starts with creating a cluster number by choosing the subdiscipline by the menu item ‘Create new clusters’
With the submenu item ‘Insert Cluster Data’ , the data of the cluster is entered.
These items are: description, entity, the various man-hours per work unit, hiring, equipment and services hours and so on.
With the print listing of hiring, equipment and services the internal orders for purchasing are made.
The calculation of hiring hours and material hours have been created by hour rates based on annual appointments with suppliers and subcontractors, so the rates are determined per year.
A storage factor for overhead is applied to these hourly rates using the table params_hours
According to the menu item Insert Articles lines per cluster, the materials to be used are introduced for the cluster in question. If all clusters are defined in this way, the basis for the cluster calculation is complete.
With this, the various clusters and their numbers are stored on the basis of the specifications in the system with the menu item ‘Create/Change Calculation’.
Of course, changing is only possible if the calculation has not been forwarded to work number.
After this the calculation is made with the menu Calculation/Article list/Printing.

With this submenu the calculation and the article list are requested or printed.
If the order for the work has been obtained, the link with the work number is made with the menu Connect Calculation → production.
Then the calculation is linked the reservations of the article list are added on reservation balance in table artikelen (articles) and in reservation balance in table materiaallijsten (bills of materials)
The calculated values and hours are added in the table werken (works) as budgeted amounts and hours budgeted in their respective disciplines.
Totals are calculated and added in table werken (works).
With the fields verwerkt (processed) and koppelnummer (linking number) in table calculations and calculatienummer (calculation number) in table werken (works) the status of the linking is stored, to prevent changing calculaties (calculations) and prevent linking when already linked.
After this, changing of the concerned calculation is no longer possible.