DETAILED INTERSWITCHING CALCULATION

Variable costs per shipper:

At year $(t0)$ for which last costing information is available:

$$VC^{t0}(s,i,z,r) = \sum_{j} \frac{C_j^{t0}(r)}{y_j(r)} v_j(r)\, y_j^*(s,i,z,r)$$

Where s is a shipper; i is an interchange; z is a zone and r is a railway company;

$C_j^{t0}(r)$ is the cost for a specific expense category j for a railway r at time t0;

$y_j(r)$ is a system service unit that drives expenses of category j;

$v_j(r)$ is the variability factor for the expense category j;

$y_j^*(s,i,z,r)$ is the interswitching service unit that corresponds to category j, it is specific to a shipper (s) that belongs to a specific interchange (i) in a specific zone (z). In addition, the shipper (s) is a client of a railway (r).

To obtain variable costs at the year of the decision (t), inflation factors $(1 + p_j)$ are applied to each cost categories j as follows:

$$VC^{t}(s,i,z,r) = \sum_{j} \frac{C_j^{t0}(r) \times (1 + p_j)}{y_j(r)} v_j\, y_j^*(s,i,z,r)$$

Inflation factors $(1 + p_j)$ that are specific to each expense category j are inserted into the above formula. These inflation factors are developed each year by the Agency.

Variable costs per zone :

Variable costs per shipper are then averaged over the interchange they belong to and the railway that was used. Shippers, interchanges and railways are weighted based on their relative share of total carloads.

$$VC(z) = \sum_{r \in z} \left[\sum_{i \in z} \left(\sum_{s \in i} VC(s,i,z,r)\, \omega_s \right) \omega_i \right] \omega_r$$

Weights:

x_s is the volume of cars (measured with carloads) related to a specific shipper (s);

$\omega_s = \frac{x_s}{\sum_{s \in i} x_s}$ is the weight of each shipper (s) in a specific interchange (i);

$\omega_i = \frac{\sum_{s \in i} x_s}{\sum_{i \in z} \sum_{s \in i} x_s}$ is the weight of each interchange (i) in a specific zone (z);

$\omega_r = \frac{\sum_{i \in z} \sum_{s \in i} x_s}{\sum_{r \in z} \sum_{i \in z} \sum_{s \in i} x_s}$ is the weight of each railway (r) in a specific zone (z).

Section 3.0 (Volume of interswitched cars) provides examples of how the weighted averages are calculated.

Final rates per zone:

The final rates per zone are obtained by applying a contribution to fixed costs ($Contr$) and a productivity factor ($1 + g$) to each variable cost per zone $VC(z)$.

$$R(z) = \frac{VC(z)\ Contr}{1 + g}$$