$$D_i = \left(\frac{\eta_{ti}}{1.2} \right)^2 \quad \textbf{(2.8)}$$

2.3.3.4 – In buildings with very stiff reinforced concrete peripheral walls at their basements, equivalent seismic loads acting on stiff basement stories and those acting on relatively flexible upper stories shall be calculated separately as given in **(a)** and **(b)** below. Such loads shall be combined for the analysis of the complete structural system.

(a) In determining the base shear and equivalent storey seismic loads acting on relatively flexible upper stories, Clauses **2.3.2** and **2.3.3** shall be applied with seismic masses of *upper stories only* taken into account. Foundation top level considered in the relevant definitions and expressions shall be replaced by the ground floor level. Fictitious loads used for the calculation of the first natural vibration period in accordance with **2.3.4.2** shall also be based on seismic masses of *upper stories only*. Appropriate behaviour factor q shall be selected from **Chapter 3** or **Chapter 4**, as appropriate, based on the structural type of the *upper stories only*.

(b) In calculating equivalent seismic loads acting on the stiff basement stories, seismic masses of *basements only* shall be taken into account. Equivalent seismic loads acting on each basement storey shall be calculated with elastic spectral acceleration of $0.4S_{DS}$ to be multiplied directly with the respective storey mass, and the resulting elastic loads shall not be reduced (i.e., $q_R = 1$).

(c) In the analysis of the complete structural system under the combined action of the equivalent seismic loads as defined in **(a)** and **(b)** above, interaction with the soil surrounding basement stories may be considered with an appropriate soil modeling.

(d) In-plane strength of ground floor system, which is surrounded by very stiff basement walls and located in the transition zone with the upper stories, shall be checked for internal forces obtained from the analysis according to **(c)** above.

2.3.4. Predominant period

2.3.4.1 – Predominant natural vibration period of the building in the earthquake direction, T_1, may be approximately estimated by the following expression:

$$T_1 = C_t H_N^{3/4} \quad \textbf{(2.9)}$$

C_t may be taken as 0.085 for moment resistant steel frames, 0.075 for moment resistant concrete frames / eccentrically braced steel frames and 0.050 for all other structures. For structures with concrete structural walls C_t may be calculated by **Eq.(2.10)**.

$$C_t = \frac{0.075}{\sqrt{A_c}} \quad \textbf{(2.10)}$$

where A_c is calculated from **Eq.(2.11)**.

$$A_c = \sum_j [A_j \, (0.2 + l_{wj}/H_N)^2] \quad \textbf{(2.11)}$$

with the condition that $l_{wj}/H_N \leq 0.9$.

2.3.4.2 – Predominant natural vibration period of the building in the earthquake direction, T_1, shall not be taken longer than the value calculated by **Eq.(2.12)**.