2. THE CONSERVATION STATE EVALUATION CRITERION

An evaluation analytical method is proposed to measure the conservation degree of a metal bridge. The proposed criterion allows to evaluate the actual state of conservation of the construction by means of the evaluation of a parameter S, which becomes a damage indicator. The calculation of such a parameter is carried out by means of a complex of analytical judgements given to all the elements which form the bridge. It must be underlined that the proposed criterion is based just on a visual survey of the structure. Parameter S is evaluated by means of the following equation:

$$S = \sum_{i=1}^{n} \sum_{j=1}^{m} G_j \cdot q_i \cdot K_{1ij} \, K_{2ij} \qquad (1)$$

n = Number of structural and not structural element types (11)
i = Element type index (1 to 11)
m = Number of damage types (5 for each element type)
j = Damage type index (1 to 5)
G = Basic number (weight) of the damage (1 to 6)
q = Basic number (weight) of the element (1 to 4)
K_1 = Damage Extension factor (0 to 1)
K_2 = Damage intensity factor (0 to 1)

Fig. 1. Diagram of relationships between evaluation program blocks

CLASS	Damage description	S
1	No or very slight damage	0÷0,11
2	Slight damage	0,09÷0,30
3	Medium damage	0,26÷0,49
4	Severe damage	0,43÷0.95
5	Very severe damage	0,85÷2,00
6	Total loss	>2

Table 1 – Values of damage parameter S and corresponding classes.

Fig. 2. A view of the Paderno railway and road bridge over Adda river (1887)

Fig. 3. Details of Paderno bridge decks, supports and pier

Fig. 4. Pontelongo bridge (Mestre-Adria railway) over Bacchiglione river (1916)

Fig. 5. San Donà road bridge over Piave river