

# USE OF GABIONS IN SMALL HYDRAULIC WORKS

## *ANNEX A*

### *HAND MADE GABION CAGES*

## **Table of Contents**

A.6.1 - INTRODUCTION.....	2
A.6.2 - MATERIALS.....	2
A.6.3 - MANUFACTURING.....	3

### A.6.1 - INTRODUCTION

Gabion cages can easily be assembled manually, and are therefore particularly well suited for use in developing countries. A simple method for manufacturing gabion cages is illustrated below. Selecting a zinc-coated wire, with mesh and seldge of the same diameter, will facilitate gabion cage manual fabrication tasks.

### A.6.2 - MATERIALS

The wire used for building the gabion cage should be zinc-coated, to avoid a rapid deterioration of its physical characteristics, such as ductility and strength. A zinc-coated wire of 3 mm. diameter will fit the purpose best, as 3 mm. is the maximum diameter allowing easy manual handling, while at the same time ensuring a high resistance of the gabion mesh to external stresses.

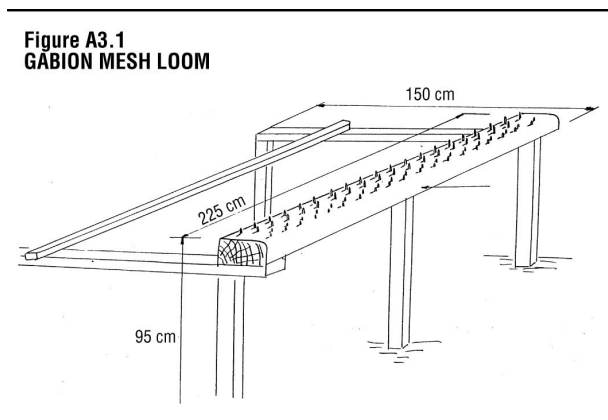


Fig. A.6.1 - Gabion mesh loom

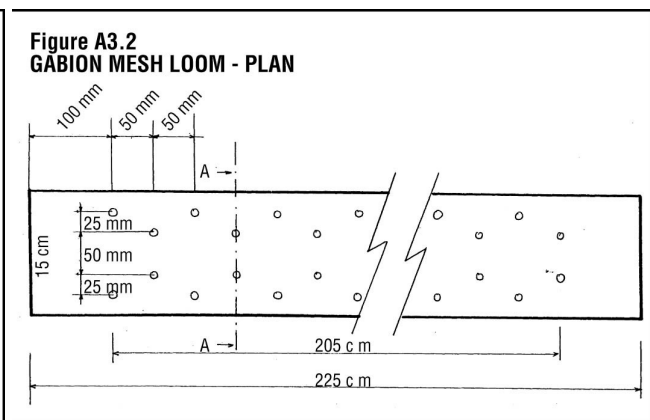


Fig. A.6.2 – Gabion mesh loom, plan

Basic tools required for gabion cage manufacturing:

- gabion mesh loom. It can be self-made locally without difficulty using steel beams according to the dimension of fig. A.6.1 and A.6.2. The loom must be equipped with a special device for holding the mesh while it is being fabricated, generally consisting of a iron/wooden bar with two clamps at each extremity (see figure A.6.5).
- bench wise for preparing the wire,
- tongs for cutting the zinc-coated wire.

### A.6.3 - MANUFACTURING

The manufacture of a gabion cage is illustrated below step by step:

a - first, the wire has to be stretched and cut at the desired length, depending on the characteristics of the mesh to be produced, as illustrated in fig. A.6.3. Then wires have to be arranged in pairs with the utilisation of bench wise and tongs as shown in figure A.6.4,



Fig. A.6.3 – Wires cutting



Fig. A.6.4 – Pairs of wires preparation

b - the wires pairs thus prepared have to be positioned on the gabion mesh loom, as shown in fig. A.6.5 and A.6.6,



Fig. A.6.5 – Pairs of wires disposition on the loom

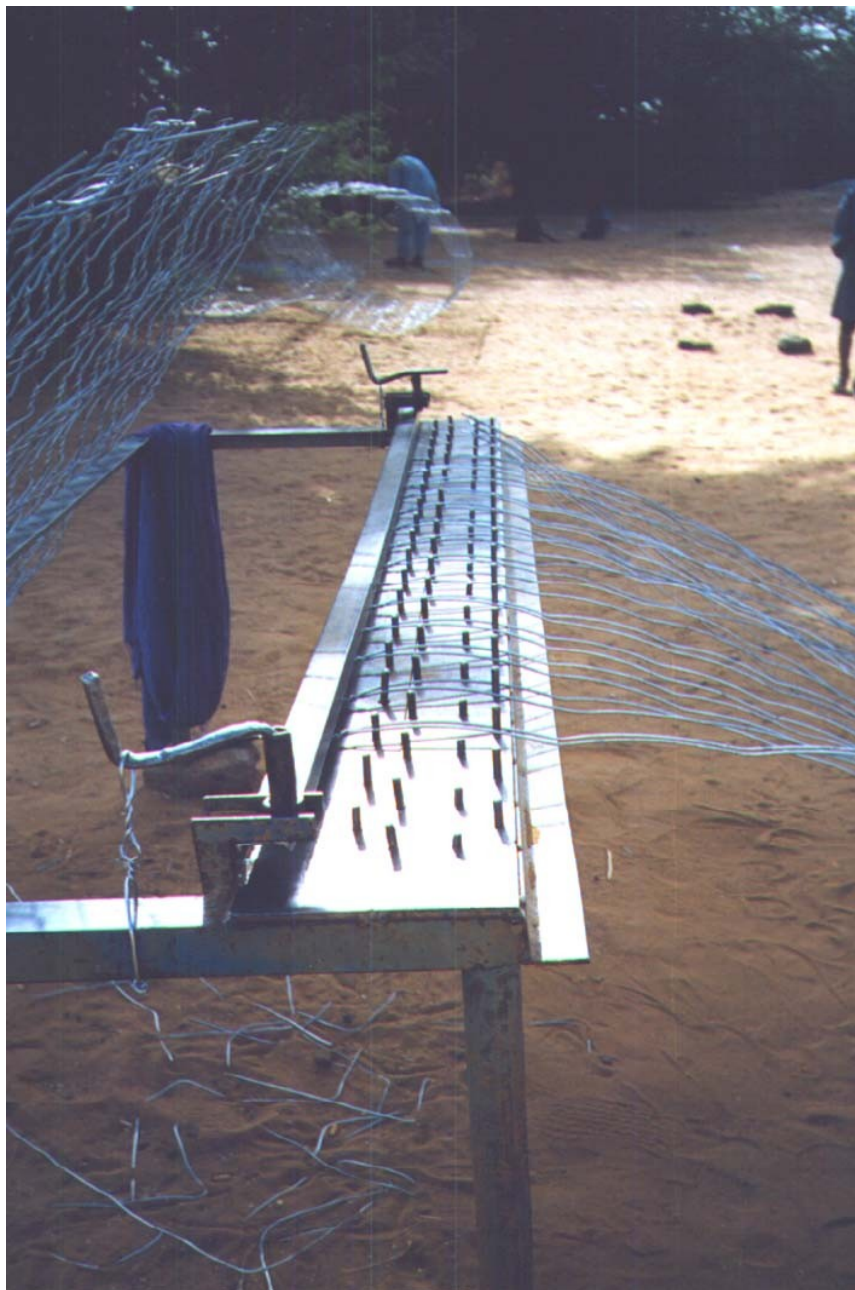


Fig. A.6.6 – Pairs of wires disposition on the loom

c - wires must be double twisted according to the dimensions imposed by the pivots on the gabion mesh loom, as shown in fig. A.6.7. When a new line of mesh is completed, the iron/wooden bar has to be removed and the loom has to be shifted back,



Fig. A.6.7 – Wires twisting

d - when the mesh has reached the required length, then exceeding wires have to be cut and the mesh can be removed from the loom as shown in figure A.6.8. Figure A.6.9 shows a mesh that will be used as the central component of a gabion cage. Now lateral panels have to be fabricated following the same procedure.



Fig. A.6.8 – Completed mesh removed from the loom



Fig. A.6.9 – Completed mesh



e - finally the gabion cage is completed by assembling the mesh prepared for the central part with the two lateral panels, as shown in fig. A.6.10.

Fig. A.6.10 – Gabion cage finally assembling

Workers endowed with a basic training will be able to carry out this method for manufacturing gabion cages easily. At least two workers at each loom are required for assembling the mesh. The amount of gabion cages that can be produced daily will depend on the number of workers at each loom and on their ability. Two skilled workers can easily produce two gabion cages per working day.

The quantity of zinc-coated wire necessary for manufacturing a gabion cage depends on the cage's dimensions. For example, about 17 Kg of 3mm. diameter wire is needed for constructing a 2x1x1 m<sup>3</sup> gabion cage.

Figure A.6.11 shows a typical workshop setting with looms, stocks of wire, prepared mesh, and completed folded gabion cages.



Fig. A.6.11 – Gabion cages workshop