

## I. Project description

1. **Project name:** Supporting live hood activities through agriculture in Meheba location integration area phase 2
2. **Project Implementation:** Association for Aid and Relief Japan (AAR Japan)
3. **Project location:** Meheba refugee camp in Zambia
4. **Project beneficiaries:** 54 refugees and local integrated peoples  
**Project duration:** from 5<sup>th</sup> April to 21<sup>st</sup> June (Training by Obed was up to 6<sup>th</sup> may. Construction continued without Obed Physically by 21<sup>st</sup> June, with daily online follow-up, led by Zambian Field assistant Gedeon).
5. **Project objectives:** Transferring labor-based skills of Do-nou technology to the refugees and local integrated peoples by rehabilitating the access road from main camp to the refugee's infrastructure and agriculture zone of Dambo-1, Dambo-2 and Kamiba
6. **Reported by** Eng. Ntakirutimana Obed

## II. Project summary outputs

- ❖ 54 participants have got the skills theoretically and practically and worked on three sections accordingly to the work process.
- ❖ 600m length of the road has cleaned
- ❖ Total length road repaired is 276m subdivided into 3 sections which are:
  - a) **Dambo -1**
    - ✓ Section of 78m has repaired and raised up to 80cm
    - ✓ Double reinforced box culvert has constructed (3000mmx3600mmx1400mm)
  - b) **Dambo-2**
    - ✓ Section of 170m has repaired and raised up to 1m
    - ✓ Two single separate reinforced box culverts have constructed (1900mmx3600mmx1400mm)
  - c) **Kamiba zone**
    - ✓ Section of 28m has repaired and raised up to 30cm
    - ✓ One single open profile reinforced box culvert has provided (2600mmx5000mmx1200mm)

## III. Project management

This project was managed by AAR Japan through its branch in Zambia and Invite CORE's Engineer from Rwanda for field engineering aspect implementation theoretically and practically. After analyzing the site conditions and agreed on the proper interventions the previous plan of project was totally changed in increase by time and cost.

**Table 1: Daily schedule during Field works**

Time	Activity
9:00am -10:00am	Practical field works
10:00 am -10:15 am	Breakfast
10:15am – 12:00am	Practical Field works
12:00am – 1:00pm	Lunch time
1:00pm – 4:30 pm	Practical field works

## IV. Project Execution Challenges

- ✓ The submitted technical proposals were challenged by the site conditions and AAR's request.
- ✓ The planification and Implementation on technical and field managements done at the same time. (Planning and Execution at once).
- ✓ Some tools and materials are not available in the location and the suppliers are from far it takes 3days to deliver the requested materials such as bags, sands, stones, iron bars, plywood cements etc.
- ✓ The procurement procedure of construction materials is not easy at remote area, and required more time.
- ✓ More assistance to procurement entity by the Engineer was required in the procurement process.
- ✓ The project implementation starting period was in the raining, it has rained up to 22<sup>nd</sup> April This affect all the field works progress and productivity.
- ✓ The Selected participants are refugees and vulnerable Zambian local integrated people they are not familiar of working a full day they are tired early and easier.
- ✓ Working daily hours was maximum 6hrs because of difficulties of transport to the participants it affects the daily productivity.
- ✓ Supervising three sections at once as one engineer it is very challenged and tiring.
- ✓ Daily Online supervision is not accurate some misunderstanding can be happened in the Execution and not given at time due to other responsibilities.

## V. Project site conditions



The two sections of the one road namely Dambo1 and Dambo2 are two separate sections of the road in wetland area of zone E in Meheba refugee camp with poor condition of flooding road by overland flow, the infiltration of water into the soil and not well maintained by ending result of a road is assumed to be completely closed when its crown is covered by water regardless of depth, The upper side of two sections are rice farms with a lot of water without irrigation to the agriculture zone and no bridges and water pass over the road profile to reach to the next down rice farms.

The proposed intervention was to raise up road profile and provide one single box culvert with one cross drain at each section of Dambo1 and Dambo 2 but by physical checking on field by receiving the past information from local peoples and observing the rain fall before 3days of starting project, the Proposed Intervention was changed by not using cross

drain rather than construction of double box culvert and raise up the road about 1m height at Dambo 1 and two separately single box culvert and raise up the road on 80cm height at Dambo2.



Kamiba zone is the section of the access road from main road to training center and primary school of Kamiba village, in middle of the road there is big pothole as result of water stagnation from rice farms in heavy rain without drainages on both side of the road and Road become impassable seasonally without maintenance.

The proposed intervention was to provide timber bridge at lowest point of the road similar as pothole to facilitate water from up side of the road to down side of the road after explaining all technical aspect on that timber bridge, the project implementer AAR Japan questioned about durability of timber because it is not possible to find good quality of timbers, they requested engineer to change the top slab materials by reinforced concrete cement rather than timber materials.

## VI. Sample Pictures of field activities



Picture1: Site cleaning



Picture2: Water deviation



Picture3: Theory session in the class



Picture 4: Filling the gaps between each four compacted Do-nou bags



Picture5: Laying and compacting different Do-nou layers



Picture6: Covering and final compaction



Picture7: Soft soil foundation stabilization with Do-nou bags



Picture8: Base foundation for box culverts



Picture 9: Iron bars bending to the fixed measurements



Picture10: Fixing The confirmed Iron bars bottom slab of bridge



Picture11: Tying the iron bars



Picture12: Curing progress



Picture13: Distribution bars fixing on the wall of box culvert

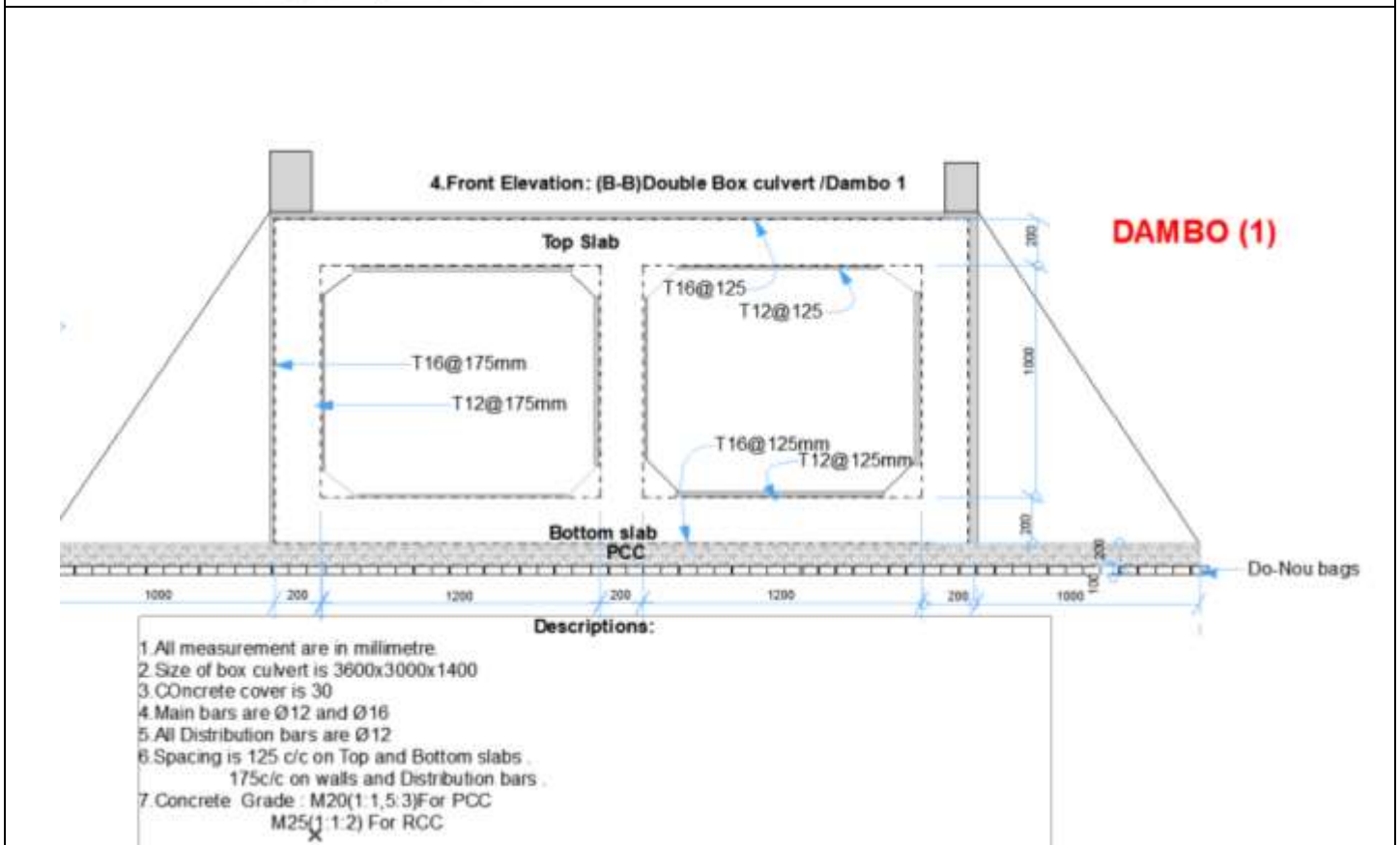
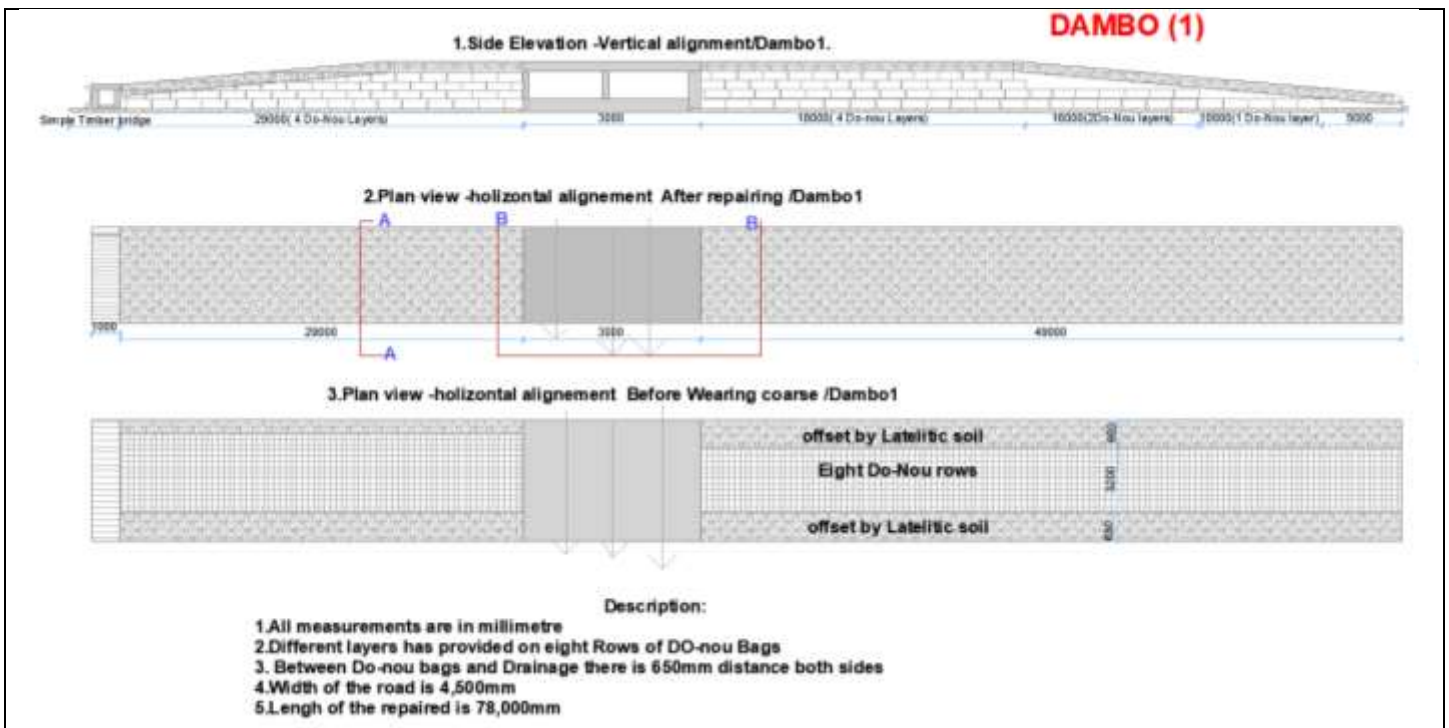


Picture 14: Shuttering process with plywood



Picture 15: Wall bridge masonry constructed at kamiba

## VII. Drawings



## DAMBO (2)

1' Side Elevation -Vertical alignment/Dambo2



2' Plan view -horizontal alignment After repairing /Dambo2



3' Plan view -horizontal alignment Before Wearing coarse /Dambo2

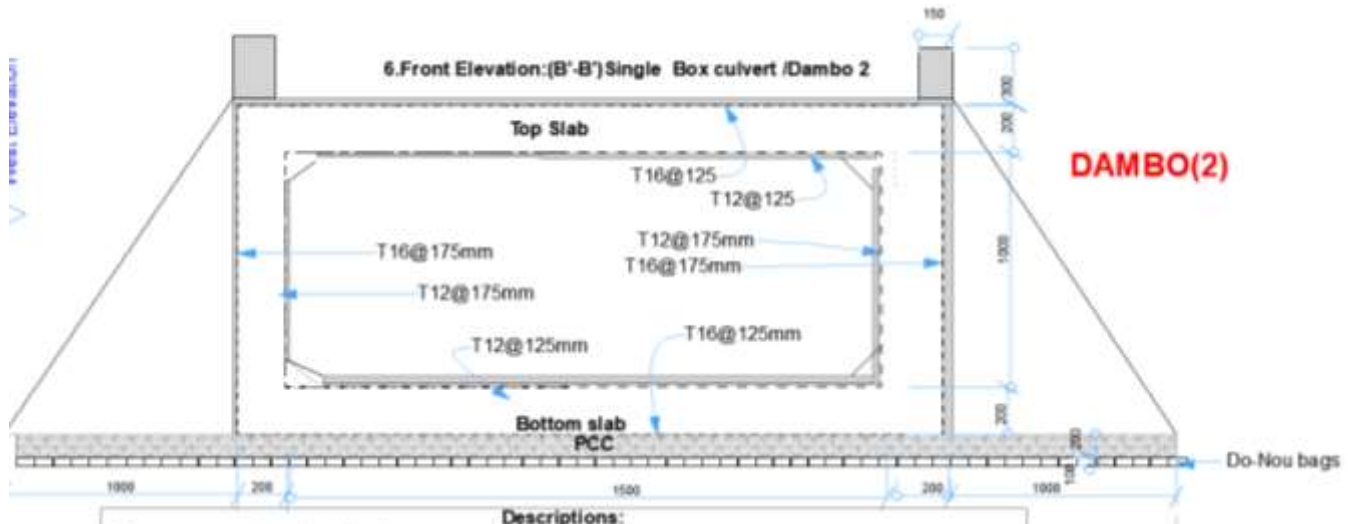


**Description:**

1. All measurements are in millimetre
2. Different layers has provided on eight Rows of DO-nou Bags
3. Between Do-nou bags and Drainage there is 400mm distance both sides
4. Width of the road is 4000mm
5. Length of repaired section is :170,000mm

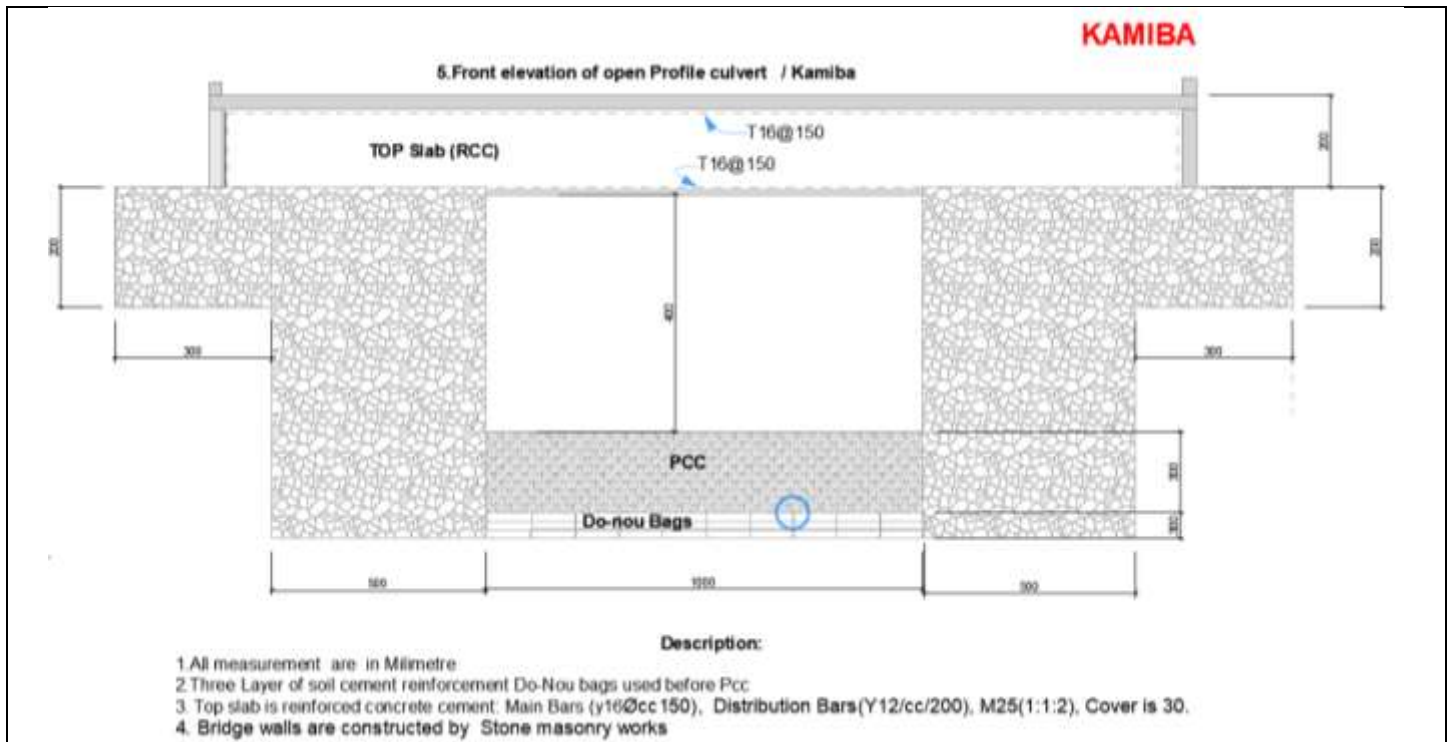
## DAMBO(2)

6 Front Elevation:(B'-B')Single Box culvert /Dambo 2



**Descriptions:**

1. All measurement are in millimetre.
2. Size of box culvert is 3600x1900x1400
3. Concrete cover is 30
4. Main bars are  $\phi 12$  and  $\phi 16$
5. All Distribution bars are  $\phi 12$
6. Spacing is 125 c/c on Top and Bottom slabs .  
175c/c on walls and Distribution bars .
7. Concrete Grade : M20(1:1.5:3) For PCC  
M25(1:1:2) For RCC
8. One layer of Do-Nou bags has used in fondation for soft soil.



## VIII. Conclusion

The proper intervention of water canalization with bridges, road base reinforcement with Do-nou technology and road profile raising have provided to the three selected sections with maintenance roads will be passable in all seasons.

## IX. Recommendation

AAR Japan with other stakeholders should provide the irrigation Technics to the rice farms for better management of water in the raining seasons and the remaining bad sections in the area can be repaired using the same technics.

## X. Lessons learnt

- ✓ It is very important to do preliminaries studies with deep analysis by the experienced technicians during critical time (raining period) before planning and all technical plan (Interventions and length) be focused on those studies.
- ✓ The plan in duration and performance should be led by consideration of participants' background, their culture and their locations.
- ✓ The project management entity should be aware on construction materials specification or hire someone with knowledge for procurement purpose if not possible the invited engineer should be in the project location at least two weeks before field project works.
- ✓ Number of engineers and assistants should go with number of sites and time expectation (one site project with one experienced engineer and assistant if not at least two sites with two experienced field assistant and one engineer as supervisor of the works).