[1]　　00:00:12:13　　00:00:17:05 Community design is the third stage of safer school construction.
[2]　　00:00:17:09　　00:00:18:21 During this stage, everyone,
[3]　　00:00:19:00　　00:00:23:09 the community, the program manager and the design team,
[4]　　00:00:23:13　　00:00:27:18 work together to design a school that will meet the community's needs
[5]　　00:00:27:22　　00:00:30:09 and be safe during disasters.
[6]　　00:00:30:13　　00:00:33:22 A community-based approach to safer school construction
[7]　　00:00:34:01　　00:00:36:00 is a collaborative process,
[8]　　00:00:36:04　　00:00:38:22 even during this technical design stage.
[9]　　00:00:39:01　　00:00:42:11 In the past, some community-based school projects
[10]　　00:00:42:15　　00:00:47:06 left design and construction up to the local community.
[11]　　00:00:47:10　　00:00:49:19 This could invite disaster.
Hindi interview 00:51:00:00
Basically communities here mainly use stone. Okay.
But there are lots of differences
between what they used to do
and how communities construct now.
They used to build a wall, and place stones that were approximately 18 inches long in the middle.
They used to put that stone across the joint in the middle of the wall. This was in the past…
And no one does that now.

They now build with reinforced concrete, but without tying the steel properly.	
That way of doing it is not right.	
That is why buildings get damaged a lot here.	
[12] 00:01:18:21 00:01:22:20 To build a safer school, the program manager must make sure	
[13] 00:01:22:24 00:01:26:01 it is designed by a qualified engineer	
[14] 00:01:26:05 00:01:29:12 who considers all the hazards the school is likely to face.	
[15] 00:01:29:16 00:01:33:18 This knowledge and experience may not be in the community	
[16] 00:01:33:22 00:01:36:23 and is not something that can be left up the community alone.	
[17] 00:01:37:02 00:01:38:14 We have a design responsibility	
[18] 00:01:38:18 00:01:43:09 to make sure that we have clear designs in place	
[19] 00:01:43:13 00:01:48:15 that meet national building codes, that adhere to international codes	
[20] 00:01:48:19 00:01:52:00 if those national codes aren't in place.	
[21] 00:01:52:04 00:01:58:20 We are able to make sure that we've spoken to the community	
[22] 00:01:58:24 00:02:00:22 about what their needs are	
[23] 00:02:01:01 00:02:03:06 and we've addressed what their needs are	
[24] 00:02:03:10 00:02:05:24 within those workshops and talks.	
[25] 00:02:06:03 00:02:10:06 And through that negotiation we have come up with a plan	
[26] 00:02:10:10 00:02:12:21 that we can all agree on and meets, as I say,	
[27] 00:02:13:00 00:02:15:22 the codes required to actually make sure	
[28] 00:02:16:01 00:02:19:05 that this building is able to withstand a number of hazards	
[29] 00:02:19:09 00:02:22:18 that have been identified	

at certain points along the way.
[30]   00:02:24:18   00:02:28:13 During this stage, the design team enters the process.
[31]   00:02:28:17   00:02:32:03 This team, often an architect and an engineer,
[32]   00:02:32:07   00:02:36:04 calculate the specific shape, layout and materials
[33]   00:02:36:08   00:02:37:19 needed to build the school.
[34]   00:02:37:23   00:02:41:13 The architect decides where classrooms, hallways,
[35]   00:02:41:17   00:02:43:16 entrances and exits are
[36]   00:02:43:20   00:02:45:21 and makes sure the school design is welcoming
[37]   00:02:46:00   00:02:50:10 and supports children's emotional and intellectual growth.
[38]   00:02:50:14   00:02:52:14 The architect also makes sure
[39]   00:02:52:18   00:02:55:23 the design meets any government standards for things like exits,
[40]   00:02:56:02   00:02:58:23 ventilation, and sanitation.
[41]   00:03:00:00   00:03:02:12 The engineer takes the architect's layout
[42]   00:03:02:16   00:03:09:00 and makes sure the school's walls, columns, beams, foundation, and roof
[43]   00:03:09:04   00:03:10:20 are strong enough.
[44]   00:03:10:24   00:03:14:15 They must be designed to protect students and staff
[45]   00:03:14:19   00:03:18:06 from the hazards identified during the planning stage.
Spanish interview 00:03:20

00:03:20 For us, the importance of safety in construction is always essential.
00:03:27 So it's extremely important to use quality materials.

00:03:35 It's important that the beams and columns are well supported,
00:03:39 that they have a proper spacing between steel stirrups
00:03:43 and that they have the correct amount of metal
and in the proper position.
00:03:51 Then we make a pre-design and pass it to a Guatemalan engineer
00:03:57 who finishes designing it according to the Guatemalan regulations, which are simple and create earthquake-resistant construction.
[46]   00:04:09:07   00:04:12:00 The design needs to be safe and inviting,
[47]   00:04:12:04   00:04:15:19 as well as simple enough for builders to complete.
[48]   00:04:16:09   00:04:19:08 If the design team selects unfamiliar materials
[49]   00:04:19:12   00:04:21:23 that require skills that local builders do not have,
[50]   00:04:22:02   00:04:24:00 the school may not be safe.
[51]   00:04:24:04   00:04:26:21 The school design will be more successful
[52]   00:04:27:00   00:04:31:01 when local builders can build a school with familiar materials.

[53] 00:04:31:05 00:04:33:13 School staff will have an easier time	
[54] 00:04:33:17 00:04:35:16 maintaining and repairing it as well.	
[55] 00:04:35:20 00:04:39:16 Best of all, when a school design uses local materials	
[56] 00:04:39:20 00:04:42:00 and some familiar construction techniques,	
[57] 00:04:42:04 00:04:44:22 families can use the safer design concepts	
[58] 00:04:45:01 00:04:48:06 when they build other structures, like houses and shops.	
Spanish interview 00:04:55	

For us here at Architects Without Frontiers,
the work with the community is very important.
We carry out these types of projects, such as housing, education and health
but as a means of strengthening the communitiy's capacities.
I think that's our strong point here at Architects without Frontiers.
We try to improve technical and economic capacities,
[and] organisation and leadership in the communities,
so that they are capable of solving their problems on their own,
without the help of any external assistance.

[59] 00:05:35:02 00:05:37:13 To make sure the school building will survive hazards,	
[60] 00:05:37:17 00:05:41:24 the design team may need to include some new construction techniques	
[61] 00:05:42:03 00:05:45:24 that local builders have never tried before.	

[62]　　00:05:47:05　　00:05:51:12 The first plan was to use local materials in building the school.
[63]　　00:05:51:16　　00:05:55:12 So we debated on it and said yes, local materials are good,
[64]　　00:05:55:16　　00:05:58:21 depending on the area we are using it.
[65]　　00:05:59:00　　00:06:00:22 For this area, there are some materials,
[66]　　00:06:01:01　　00:06:03:02 if you use it here, it will not last.
[67]　　00:06:03:06　　00:06:05:15 It will not be suitable for this area.
[68]　　00:06:05:19　　00:06:07:13 And then some of the metals they use,
[69]　　00:06:07:17　　00:06:10:13 I think they are doss [sheet metal], the metals they use.
[70]　　00:06:10:17　　00:06:15:18 We tell them that here the sea-breeze is very, very high.
[71]　　00:06:15:22　　00:06:19:05 It will not last for even two months; it will rust.
[72]　　00:06:20:18　　00:06:21:18 The design team should
[73]　　00:06:21:22　　00:06:25:01 introduce these new construction techniques carefully.
[74]　　00:06:25:05　　00:06:27:10 Local builders may not be able
[75]　　00:06:27:14　　00:06:29:19 to learn new construction techniques quickly enough,
[76]　　00:06:29:23　　00:06:33:21 no matter how hazard-resistant and innovative they may be.
[77]　　00:06:34:00　　00:06:35:19 But if these safer construction techniques
[78]　　00:06:35:23　　00:06:39:03 are added to what builders are already familiar with,
[79]　　00:06:39:07　　00:06:43:19 they will only have to make small changes to their practices.
[80]　　00:06:43:23　　00:06:47:15 They will not have to learn a whole new way to build.

[81]　00:06:49:15　00:06:51:16 There are three steps in the design stage
[82]　00:06:51:20　00:06:55:19 that ensure the community and the design team work together:
[83]　00:06:55:23　00:06:57:22 Step 1: Consult with the community.
[84]　00:06:58:01　00:07:01:08 Step 2: Sketch design options.
[85]　00:07:01:12　00:07:04:22 Step 3: Finalise the design.
[86]　00:07:06:11　00:07:09:02 Step 1: Consult with the community.
[87]　00:07:09:20　00:07:10:21 During this step,
[88]　00:07:11:00　00:07:14:02 the design team meets with the community and program manager.
[89]　00:07:14:06　00:07:18:00 Together they talk about the layout and strength of the school.
[90]　00:07:20:08　00:07:24:12 Architects without Frontiers came with some Spanish architects.
[91]　00:07:24:16　00:07:27:15 So they came, they started doing some workshops with the kids,
[92]　00:07:27:19　00:07:32:01 with the students, and letting them dream.
[93]　00:07:32:05　00:07:34:09 "How do you see your school? "
[94]　00:07:34:13　00:07:36:13 "We are very interested in that."
[95]　00:07:36:17　00:07:40:02 They created that kind of design with students.
00:07:43:00 Spanish interview
The Spanish people who came asked us
about whether we wanted to build
a one-storey
or a two-storey secondary school.
[96]　00:07:53:06　00:07:56:00 One of the most important parts of this conversation
[97]　00:07:56:04　00:07:59:23 is how well the school will perform

when a hazard strikes.
[98]   00:08:00:02   00:08:01:23 The architect talks with the community
[99]   00:08:02:02   00:08:04:05 about layout and aspirations,
[100]   00:08:04:09   00:08:06:09 the engineer, with the program manager
[101]   00:08:06:13   00:08:08:10 and the school management committee
[102]   00:08:08:14   00:08:11:12 about how strong the school needs to be.
[103]   00:08:12:13   00:08:14:13 The engineer always makes sure
[104]   00:08:14:17   00:08:17:13 the building performs to "life safety" standards.
[105]   00:08:17:17   00:08:21:03 "Life safety" means the school will not collapse
[106]   00:08:21:07   00:08:24:18 and will protect students and staff during a disaster.
[107]   00:08:24:22   00:08:28:20 However, life-safe buildings often need to be torn down and rebuilt
[108]   00:08:28:24   00:08:32:18 after large disasters, because they become weakened and dangerous.
[109]   00:08:32:22   00:08:35:20 For a rare hazard, life-safe may be enough.
[110]   00:08:36:10   00:08:39:24 But if the community experiences large disasters frequently,
[111]   00:08:40:03   00:08:42:02 they may want the school to perform better
[112]   00:08:42:06   00:08:43:20 than just life-safe.
[113]   00:08:44:21   00:08:46:17 With more construction materials,
[114]   00:08:46:21   00:08:49:18 the building can be designed for "immediate occupancy".
[115]   00:08:49:22   00:08:52:08 This means the school will not be heavily damaged
[116]   00:08:52:12   00:08:56:00 and can be used during and after the disaster.
[117]   00:08:56:04   00:08:59:04 If the school is used as a temporary shelter during disasters,

[118]   00:08:59:08   00:09:03:02 the design team needs to plan for this possibility.
[119]   00:09:03:06   00:09:05:07 They need to ensure the school is large enough
[120]   00:09:05:11   00:09:07:20 and built to be strong enough for this use.
[121]   00:09:12:10   00:09:15:21 Balancing construction cost with disaster performance
[122]   00:09:16:00   00:09:19:06 is an important decision the design team needs to discuss
[123]   00:09:19:10   00:09:21:19 with the community and program manager.
[124]   00:09:21:23   00:09:23:21 During community consultation,
[125]   00:09:24:00   00:09:27:03 the design team also gets to know the school site.
[126]   00:09:27:07   00:09:31:03 This is important, as the type of soil on the site
[127]   00:09:31:07   00:09:34:00 may change how strong the school foundation needs to be.
[128]   00:09:34:04   00:09:36:20 A sloping site might need some grading
[129]   00:09:36:24   00:09:39:10 or a swampy site might need to be drained.
[130]   00:09:39:14   00:09:43:09 If the school needs to survive hazards such as earthquakes,
[131]   00:09:43:13   00:09:46:19 the design team may even need to hire scientists,
[132]   00:09:46:23   00:09:51:04 such as geologists, to thoroughly investigate the site.
[133]   00:09:51:15   00:09:54:19 After consulting with the community and understanding the site,
[134]   00:09:54:23   00:09:57:09 the design team can move on to the next step.
[135]   00:09:57:13   00:10:00:24 Step 2: Sketch design options.
[136]   00:10:01:03   00:10:03:21 The design options are models or drawings

[137] 00:10:04:00 00:10:06:00 that include the ideas discussed.		
[138] 00:10:06:04 00:10:08:22 They show different ways the school building could be laid out		
[139] 00:10:09:01 00:10:11:19 and which materials might work.		
[140] 00:10:11:23 00:10:13:20 The community then looks at these models or drawings		
[141] 00:10:13:24 00:10:16:21 and discusses which option is best for them.		
[142] 00:10:17:00 00:10:18:21 Of course, the engineer makes sure		
[143] 00:10:19:00 00:10:24:17 all options will keep students and staff safe during disasters.		
[144] 00:10:25:18 00:10:28:11 The design team should clearly highlight		
[145] 00:10:28:15 00:10:31:05 the safety features of each option.		
[146] 00:10:32:06 00:10:35:05 When the design team shows the community the design options,		
[147] 00:10:35:09 00:10:37:09 the team should make sure they understand		
[148] 00:10:37:13 00:10:41:08 that safer school construction doesn't mean an expensive building.		
[149] 00:10:41:12 00:10:44:20 It means using materials and techniques effectively.		
[150] 00:10:44:24 00:10:49:04 We make sure that the community are engaged at every phase.		
[151] 00:10:49:08 00:10:55:18 We do monthly meetings that we engage the community, the elders,		
[152] 00:10:55:22 00:10:57:00 especially the elders of the community,		
[153] 00:10:57:04 00:11:00:13 and we explain to them that this is where we've gotten to,		
[154] 00:11:00:17 00:11:02:24 this is where we're heading towards the next month,		
[155] 00:11:03:03 00:11:07:01 so they do appreciate every stage that we've got to.		
[156] 00:11:07:16 00:11:09:00 Simple changes,		

[157] 00:11:09:04 00:11:12:09 such as adding a higher portion of cement in a concrete mix,		
[158] 00:11:12:13 00:11:15:05 considering where to place the school building on a site,		
[159] 00:11:15:09 00:11:18:00 or carefully bending and placing reinforcing bars		
[160] 00:11:18:04 00:11:20:16 in a concrete column, can increase safety,		
[161] 00:11:20:20 00:11:23:14 and with only a small increase in cost.		
[162] 00:11:23:18 00:11:27:16 Some safer construction techniques do not add any cost.		
[163] 00:11:29:02 00:11:32:15 The conversation between the community and design team		
[164] 00:11:32:19 00:11:34:11 helps the community understand		
[165] 00:11:34:15 00:11:38:03 that buildings can be built to protect them in disasters.		
[166] 00:11:39:19 00:11:43:05 Once the design team understands the community's preferences,		
[167] 00:11:43:09 00:11:45:18 they can begin the next step.		
[168] 00:11:45:22 00:11:49:11 Step 3: Finalise the design.		
[169] 00:11:49:15 00:11:52:08 This is the step where the design team takes the option		
[170] 00:11:52:12 00:11:54:01 the community has chosen		
[171] 00:11:54:05 00:11:58:12 back to the office to work out the calculations and final layout.		
[172] 00:11:59:06 00:12:02:23 Many decisions made now will affect safety later.		
[173] 00:12:03:02 00:12:05:13 Of course, the size and strength of construction materials		
[174] 00:12:05:17 00:12:07:16 the design team choose, are important.		
[175] 00:12:07:20 00:12:11:02 But so are other architectural decisions they make.		
[176] 00:12:11:06 00:12:15:12 A raised foundation can keep floodwaters out of classrooms.		

[177]   00:12:15:16   00:12:17:10 Window shutters and roof vents
[178]   00:12:17:14   00:12:20:05 can lower classroom temperatures in hot climates.
[179]   00:12:20:09   00:12:23:20 Handrails and ramps can help students avoid trips and falls.
[180]   00:12:24:15   00:12:26:10 Classroom doors that open outwards
[181]   00:12:26:14   00:12:29:15 can allow students to evacuate better.
[182]   00:12:29:19   00:12:33:24 All these design choices are part of building a safer school.
[183]   00:12:34:21   00:12:39:05 Finalising the school design is a very technical step.
[184]   00:12:39:09   00:12:40:11 But part of this step
[185]   00:12:40:15   00:12:43:07 is also deciding who will manage the construction process
[186]   00:12:43:11   00:12:47:04 and how much the community can be involved.
[187]   00:12:47:08   00:12:51:19 Community involvement will often depend on the skills, experience
[188]   00:12:51:23   00:12:54:00 and interest of the community.
[189]   00:12:55:00   00:12:57:22 This will guide the design team in how they communicate
[190]   00:12:58:01   00:13:00:09 and draw the design.
[191]   00:13:00:13   00:13:02:16 If an experienced contractor is hired,
[192]   00:13:02:20   00:13:06:11 the design drawings will probably be traditional blueprints.
[193]   00:13:06:15   00:13:09:09 However, if the community will be heavily involved,
[194]   00:13:09:13   00:13:13:17 the design team needs to make sure everyone can understand the drawings.
[195]   00:13:13:21   00:13:16:20 Design drawings may need to be pictorial.
[196]   00:13:18:09   00:13:20:05 Consulting with the community,
[197]   00:13:20:09   00:13:22:02 sketching design options

[198] 00:13:22:06 00:13:24:01 and finalising the design,		
[199] 00:13:24:05 00:13:29:02 makes sure the school design is safe and supported by the community.		
[200] 00:13:29:06 00:13:32:00 The school management committee, government authorities,		
[201] 00:13:32:04 00:13:34:20 and design team approve the design		
[202] 00:13:34:24 00:13:37:10 and the construction stage can begin.		