Introduction

You know… I didn't come into this process expecting this to be the most difficult part for me. I've always tested high in spatial recognition, but the complexity of the Golden Gate Bridge and my slight OCD kept getting in the way of this question.

Part of me wanted to resort to Duplo's but I think I can do better than that, so here we go….

The number of Lego bricks it would take me to build the Golden Gate Bridge is 1,155, and here is how I arrived at that number.

Definitions

Before I begin, let me start with defining some terms. As I refer to Lego bricks, I will refer to them thusly: each brick will be represented by the number of pips wide, then the number of pips in length and finally, by the brick's height. Where a height isn't present, we will assume the brick is a height of one, which is the smallest standard Lego brick height (where the Lego brick may be perceived as "flat.").

Here is an example of the notation I will use:

2x4x1

This notation represents a brick that is two pips wide, four pips in length and "flat." Another way to notate this brick is 2x4 as the "x1" is implied.

Alright, so there we go, now onto my solution.

Let's Start at the Beginning

To start, it's best to build the supporting structures that will support the bridge. Each of these supports has a cement foundation. To represent this foundation, we will use alternating layers where the first layer is three 2x4 bricks side by side with a layer of 6x2 bricks on top. We'll repeat this twice, with four layers total, giving us 10 bricks per foundation and two foundations, giving up 20 bricks.

Next, we'll build the supporting structures up to the actual road. These structures contain two main pillars with three crossbeams connected by X's.

The X's will be a predetermined size since diagonals are limited by the bricks. Each X will consist of 13 1x2 bricks. We'll have four X's, so that's 52 more bricks.

There's a crossbeam at the bottom, middle and top of each X. Since each X is eight pips wide, we'll want to add two pips to each side in order to connect the crossbeams to the pillars. Let's use three 1x4 bricks with two 1x2 bricks and two 1x4 bricks stacked on top. That's seven bricks per crossbeam and six crossbeams total for a 42 bricks.

If you're keeping a running total, that's 112 bricks thus far.

Don't Cross Me

Now, let's build our pillars up to the road. We've already defined that each pillar will be two pips wide, so let's make the full pillar 2x3 pips to fit our crossbeams and X's. The majority of our pieces then can be

2x3 bricks stacked on top of each other.

To get some starting height, let's say we'll go six bricks high on each pillar before we hit a crossbeam, giving us an additional 24 bricks.

Where the crossbeams will intersect with the pillars, we need to create a 2x1x2 gap. To do this, we'll use two 2x1x2 bricks on either side of the crossbeam and then stack more 2x3 bricks on top to secure the crossbeam in place.

So, for each crossbeam intersection (of which there are six per pillar and, therefore, 12 total), we'd need 48 more bricks.

Finally, each X is seven "flat" bricks high, so we'll need seven more 2x3 bricks in each pillar between each crossbar. That's 14 per pillar with four pillars for 56 bricks.

This now brings us to 240 bricks.

Where the Roads Are Made of Brick

Now it's time for the road. To create support for the road, we'll use three layers of 2x4 bricks with some 2x2 bricks when alternating. Let's say we go four layers. Now we just have to determine the distance between the pillars.

Before we can do that, we have to determine suspension part of our suspension bridge. From what I can tell (I've never seen the Golden Gate Bridge in person), there are 20 wires per each half hyperbolic curve. Each wire will be a 1x1 brick and let's say each has one pip in-between it and the next wire. This gives us a 42 pip span per hyperbolic half, which means, there are 42 pips on either side leading up to a pillar and 84 between the pillars. Each pillar is 3 pips wide, so that adds 6 pips to each side bringing us to 174 pips.

174 pips can be made up of 43 2x4 bricks and one 2x2 brick per layer. That's 44 bricks per layer times four layers, so 176 bricks per side and two sides taking us to 352 bricks.

To create the road across we can use 12x6 blocks and 29 bricks total.

Finally, for esthetics, let's add two more layers on top of the road, which will also add extra support. Using the same numbers as above, that's 88 bricks per side and 176 bricks total.

We're now at 797 bricks and a lot of money at the Lego Store, but let's keep on keepin' on….

Sky High

Let's finish the pillars. Above the bridge, there is the main opening and then openings above that. We'll need three more crossbeams per pillar, which are seven bricks each. That's 42 more bricks.

The opening at the top of each pillar seem to grow smaller as they get higher at about 2/3, 1/2, 1/3. Let's use six as a starting number since it's easily divisible by three and two. That means the first opening (2/3) will be eight, the second (1/2) six and finally (1/3) four. That's 18 per side or 36 per pillar and 72 total.

Finally, we add in the bricks needed to help attach the crossbeams, which if we recall is four for each

crossbeam (two for each side). That's another 24 bricks.

Now our total is at 935.

We need to add some initial height to the top of each pillar. Let's keep our same ratio from above and say that 12 on each side, 24 per pillar and 48 total.

983 is the new total.

Suspending Reality

I think that's about it with one exception. We need to account for the suspension wire. We'll use special Lego bricks here that have eyes in them to thread string through. We'll need one for each of the aforementioned lines; that's 80 per side or 160 total.

Then we need to attach the string to the top of each pillar, adding eight more bricks and finally four to attach it at the start and end of the bridge.

And that brings us to the total originally stated of 1,155.

A Cautionary Tale

Finally, a note of caution: I am not an engineer. This structure may not turn out to be structurally sound. It could collapse on itself, so proceed with caution. It may have been better to start with this, but isn't the journey half the fun?