Bethlehem Steel Company

F68BH TTX Flat Car

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The brilliance of the TTX family of F68 flat cars lies in TTX's ability to use a common base design while outfitting the deck area with different configurations to result in a wide range of specialized cars. The car you have purchased, the F68BH, is the newest member of our F68 family, and is equipped with finger racks for hauling steel rebar. Other configurations we currently have available are the F68AH (which features full or half-height bulkheads), the F68CH (a general service flat car) and the F68DH, which is designed for special service, typically transporting large mobile equipment such as farm tractors and earthmoving machinery.

This kit is designed for assembly over just a few evenings. The instructions are organized into four parts: first, building the basic car; second, adding deck details specific to the BH version; third, painting and decaling and fourth, making a few finishing touches to your completed model. Following this sequence will ensure a smooth, efficient build. When finished, you'll have a distinctive TTX flatcar ready to handle the very specific load of steel rebars.

But First… the History of the Car

Built for the Trailer Train Company, the F68BH flatcar was manufactured at Bethlehem Steel Company's Johnstown, PA plant. An initial group of 150 cars was produced between December 1969 and March 1970, all delivered in the original boxcar-red TTX paint scheme; the cars were subsequently painted in the standard TTX yellow scheme.

Designed specifically to haul steel rebar from Bethlehem Steel's plant in Steelton, PA, the cars feature distinctive "finger" racks that separate the individual rebar bundles loaded onto the deck.

Many of these cars remain in service today hauling steel rebar.

The Oley Valley Railcar model represents the cars as originally constructed and later repainted in the TTX yellow scheme, carrying the reporting marks TTJX.

Bill of Materials

F68BH TTX Flat Car

Car Body & Underside Details

PIECE #	NAME	QUANTITY
1	Sheet Metal Deck	1
2	3D Printed Underframe • 2a "A" End of Underframe • 2b Center of Underframe • 2c "B" End of Underframe	3
3	Large Sheet of 3M Pressure Sensitive Adhesive Tape	1
4	3D Printed Bolsters and Coupler Pocket	2
5	3D Printed Coupler Box Covers	2
6	3D Printed Car Endplates • Resin 3D Printed "A" Endplate • Resin 3D Printed "B" Endplate • Filament 3D Printed "A" Endplate • Filament 3D Printed "B" Endplate	 1 1 1 1
7	Small Sheet of 3M Pressure Sensitive Adhesive Tape	2
8	Package of 900 Kadee "G-Scale" Couplers: • Kadee 900 Couplers (2) • Kadee 908 Draft Gear Springs (3) *1 spare provided	1
9	3D Printed Brake Wheel	1
10	Steel Wire Brake Wheel Staff	1
11	3D Printed Triple Valve	1
12	3D Printed Air Reservoir	1
13	3D Printed Air Cylinder	1
14	.035 Formed Brass Wire to Make the Following Pieces: • Coupler Cut Lever (2) • Side End Handrails (4)	1
15	3D Fixture for Bending Side & End Handrails	1
16	*omitted*	
17	3D Printed Side End Steps	4
18	Small Rare Earth Magnets for Side End Steps	4
19	Package of Kadee Barber S2 100-ton Metal Trucks	1
20	Package of Decals (Original TTX Logo Design)	1

Tools and Supplies Needed to Complete the Project:

- File
- 150 Grit Sandpaper
- CA Glue
- Needle Nose Pliers

Basic Car Construction (Steps 1-11)

STEP 1

Open the kit and familiarize yourself with each of the parts included.

STEP 2

Locate **Pieces 2a 2b & 2c,** the 3D-printed *underframe*. First remove any excess material (flashing) using a file and/or sandpaper. This would include the round circles at the corners of each piece. These circles aid in the 3D printing process. Next, ensure the flat side is smooth and free from imperfections by sanding with a block sander if necessary.

STEP 3

Wipe down **Piece 1**, the *sheet metal deck*, using paper towels soaked in lacquer thinner. Perform this task in a well-ventilated area while wearing appropriate personal protective equipment (PPE). The rolling process may leave a fine film of oil on the surface, especially on the underside, which must be thoroughly removed to ensure proper adhesion of **Piece 3** (*pressure sensitive tape*). Similarly, clean the oil residue from the bent/formed side edges and the top surface to facilitate the application of additional tape and later painting.

STEP 4

Cut **Piece 3** (*pressure sensitive tape*) in the shape of the three **Piece 2s** (*3D-printed underframe*).

STEP 5

Locate the two **Piece 4s** (*3D-printed bolsters & coupler pockets*) and **Piece 7s** (*small sheet of pressure sensitive tape*). Cut the tape to the shape of each **Piece 4**.

STEP 6

Find the two **Piece 6s** (*3D-printed car endplates*). Place the following pieces (in order) on **Piece 1** (*sheet metal deck*) to test the fit:

Piece 6 – Piece 4 – Piece 2a – Piece 2b – Piece 2c - Piece 4 – Piece 6

This forms the underframe of the car. Ensure that both **Piece 6**s are aligned flush with the end of **Piece 1**. If not, gently sand or file both ends of **Piece 2 (2a and 2c)** until it fits evenly. Mark the location of **Pieces 2** on **Piece 1** for accurate placement in Step 7.

STEP 7

Peel off the backing from one side of **Piece 3** and carefully position it within the marked area from Step 6 onto **Piece 1**. Press the tape onto **Piece 1** by hand to avoid creating any air bubbles or wrinkles in the tape.

STEP 8

Peel off the backing from the tape and carefully position the three **Piece 2s** onto **Piece 1** in the marked location. Then, apply spring clamps in a similar manner to the method depicted in the attached photo.

STEP 9

Peel off the backing from one side of both **Piece 7s** and place them on **Piece 1** next to the ends of **Piece 2**. Repeat the pressing process to ensure proper adhesion of the tape.

STEP 10

Peel off the backing from each **Piece 7** tape and position a **Piece 4** on each tape. Then apply spring clamps to each **Piece 4** in a similar manner as shown in the photo.

STEP 11

After assembling and clamping the parts, leave the clamped assembly undisturbed for 24 hours. This allows the tape to fully activate under the pressure of the clamps. This is an ideal stopping point for the first night!

***Lessons Learned**: This step posed a major challenge in the development of our cars, as we initially used CA glue, which repeatedly failed once the cars were in service. A friend, who is an expert in joining dissimilar materials, particularly in the field of optics, recommended using 3M tape. Since switching to this "High Tech" tape, we have not experienced any failures.*

Adding Details (Steps 12-21)

STEP 12

Remove clamps.

STEP 13

Locate **Piece 11** (*3D printed triple valve*) , **Piece 12** (*3D printed air reservoir*) and **Piece 13** (*3D printed air* cylinder), and attach using CA glue in the positions shown in the photos included at the end of this document.

STEP 14

Use **Piece 14** to create four end handrails. Begin by cutting brass into 1 1/4-inch lengths, then bend the four pieces according to the photo.

STEP 15

Apply CA glue to attach **Piece 6** onto **Piece 4** to finish the endplate of the underframe. Then insert four handrails (from Step 17) into **Piece 6**.

STEP 16

Wipe down the *sheet metal top deck* of your **assembled car** using paper towels dampened in lacquer thinner, being careful not to damage any of the parts already added. Perform this task in a well-ventilated area while wearing appropriate personal protective equipment (PPE). The rolling process may leave a fine film of oil on the surface, which must be thoroughly removed to ensure proper adhesion of **Pieces 21 & 30** (*pressure sensitive tape*).

STEP 17

Locate the **Piece 30** strips (*long strips of pressure-sensitive tape*). Peel off the backing from one side and apply along the full length of the outside edge (side sill) of **Piece 1**, (*sheet-metal deck*) which is now the assembled car.

STEP 18

Remove the second backing from the **Piece 30** strips. Attach **Pieces 31a, 31b, and 31c** (*side sills*) along one side.

STEP 19

Repeat Step 18 on the opposite side.

STEP 20

Secure the tape by applying spring clamps along both sides to ensure proper adhesion.

STEP 21

Leave clamps in place for 24 hours. This makes a good stopping point for the night.

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F68BH TTX Flat Car Deck

Bill of Materials

PIECE #	NAME	QUANTITY
21	Large Narrow Sheet of 3M Pressure-Sensitive Adhesive Tape	2
22	Laser-Cut .010" Styrene Plastic Strips (Short)	4
23	Laser-Cut .010" Styrene Plastic Strips (Long)	4
24	3D-Printed Riser Tiedown Assembly	11
25	3D-Printed Fingers	2
26	Rare Earth Magnets	12

Deck Construction (Steps 22-35)

STEP 22

Wipe down the *sheet metal top deck* of your **assembled car** using paper towels dampened in lacquer thinner, being careful not the already applied components. Perform this task in a well-ventilated area while wearing appropriate personal protective equipment (PPE). The rolling process may leave a fine film of oil on the surface, especially on the underside, which must be thoroughly removed to ensure proper adhesion of **Piece 21** (*pressure sensitive tape*).

STEP 23

Cut two **Piece 21s** (*pressure sensitive tape*) in the shape of the **assembled car's deck**. Note these pieces are designed to extend from the side sill towards the center sill but not to the centerline of the car, as shown in Photo 14.

STEP 24

Peel off the backing from one side of **Piece 21** (*pressure sensitive tape*) and carefully position along the entire length of the deck. Press the tape onto the **assembled car's deck** by hand to avoid creating any air bubbles or wrinkles in the tape. Repeat for the second piece of tape **Piece 21** on the opposite side of the car.

STEP 25

The four **Piece 22s** *(short laser-cut .010" styrene plastic strips)* form the ends of the deck from both the "A" and "B" ends. Peel off the backing from the tape and carefully position a **Piece 22** at each of these four locations.

STEP 26

The four **Piece 23s** *(long laser-cut .010" styrene plastic strips)* form the deck from the centerline of the car to the "finger racks". Find and mark the exact centerline of the car, using this as the starting point to apply each of the four Piece 23s. Note that a gap in the plastic decking will occur at each of the two "finger racks" as shown in Photo 15.

STEP 27

Place two **Piece 24s** *(3D-printed Riser Tiedown Assembly)* between the "A" End and the finger rack, paying close attention to the location of **Piece 24** and the side pockets shown in Photo 11. Attach using a few drops of CA glue near the side sills. Using a small machinist's square will help to ensure proper alignment as you work through Steps 27-30.

STEP 28

Follow the same procedure to place two **Piece 24s** *(3D-printed Riser Tiedown Assembly)* between the "B" End and the finger rack, again paying close attention to the placement shown in Photos 12 & 13.

STEP 29

Place one **Piece 24** *(3D-printed Riser Tiedown Assembly)* at the centerline of the car, covering the two pieces of deck plate on each side. This is the fourth assembly up from the finger rack as shown in Photo 13. Attach using a few drops of CA glue near the side sills.

STEP 30

Place the remaining six **Piece 24s (**three on each side of centerline) as shown in Photo 14.

STEP 31

Turn the car upside down and place it on a flat surface. Evenly distribute several pounds of weight along the center sill—bricks or similarly dense objects work well.

Allow the car to sit undisturbed for 24 hours to ensure proper bonding.

STEP 32

Locate the two **Piece 25s** (*3D-printed finger racks*) and twelve **Piece 26s** (*rare earth magnets*). Insert the magnets into the holes on the underside of each finger rack. Some holes may require light drilling to allow proper magnet insertion. Additional magnets are included if greater holding power is desired.

Painting & Decaling (Steps 33-35)

STEP 33

Clean the assembly and finger racks with warm water and mild soap. Rinse thoroughly and let dry.

Using 10 mm Tamiya modeling masking tape, tape off 10 mm at the top of each finger rack.

Once dry, apply primer and allow to dry completely. We prefer Rust-oleum 2081380 Auto Primer Flat Light Grey.

Based upon our research, we recommend using Rust-oleum 327896 Gloss Marigold as the final color. The TTX yellow tint has changed several times over the years, but this appears to be a good match. Apply several light coats for better coverage, especially with yellow, which can be challenging to cover. Alternatively, using a white primer may reduce the need for multiple coats.

Locate **Pieces 9** (*3D-printed brake wheel*) and **10** (*steel wire brake wheel staff*). Assemble and paint these as well.

Remove masking tape when paint is dry.

Helpful Hint: To improve spray paint coverage, warm the spray can in water at around 100 degrees Fahrenheit. This helps atomize the paint better. Remember to apply multiple light coats and practice patience, especially with yellow paint.

STEP 34

Apply Circus City decals as shown in the photos.

STEP 35

Apply a clear coat over the entire car for added protection and finish. We recommend using Tamiya brand Clear Coat, available in gloss, semi-gloss, and flat finishes. Apply light coats for the best results, ensuring even coverage.

Final Assembly (Step 36)

STEP 36

Install the Kadee 100-ton trucks using the short sheet metal screws included in the package. Drill the Kadee coupler pocket screw holes using a #41 drill. Then, attach the two #900 Kadee couplers using the short screws provided with the couplers.

Install the brake wheel staff in the "B" end of the car using the bracket next to the coupler.

Place the two finger racks in position on the car. The magnets should help prevent damage to the car in the event of a derailment.

You may choose to weather the car for added realism. Create your own load using your piano wire or plastic rods tie into bundles of around 20 and fill the car. Remember the rebars were never loaded any higher that the fingers meaning the outside piles will not be as tall.

PHOTO 1: Layout of the Overall Underframe of the Car

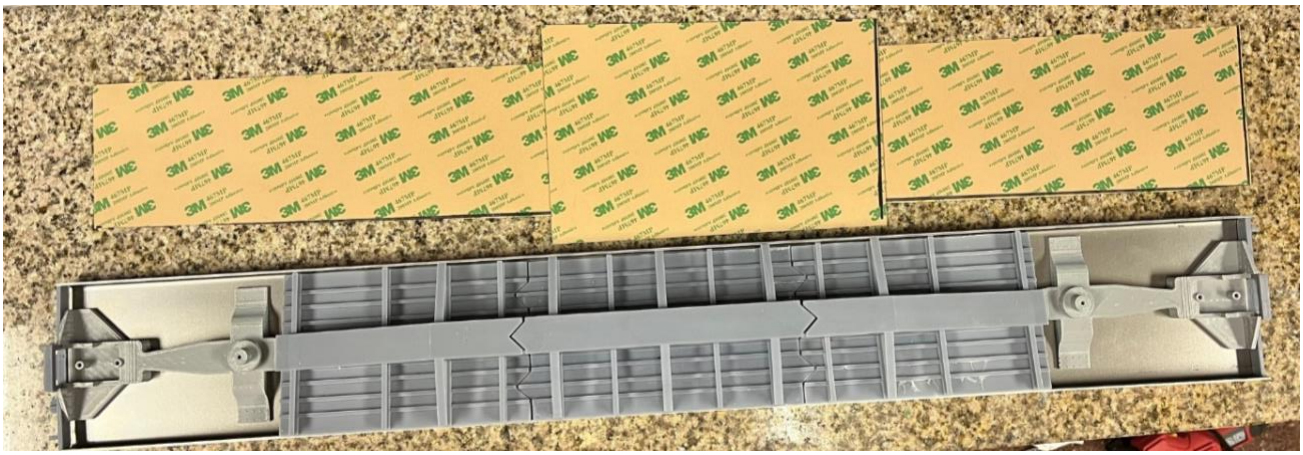

PHOTO 2: Detail Photo -- End of the Underframe of the Car ("B" End)

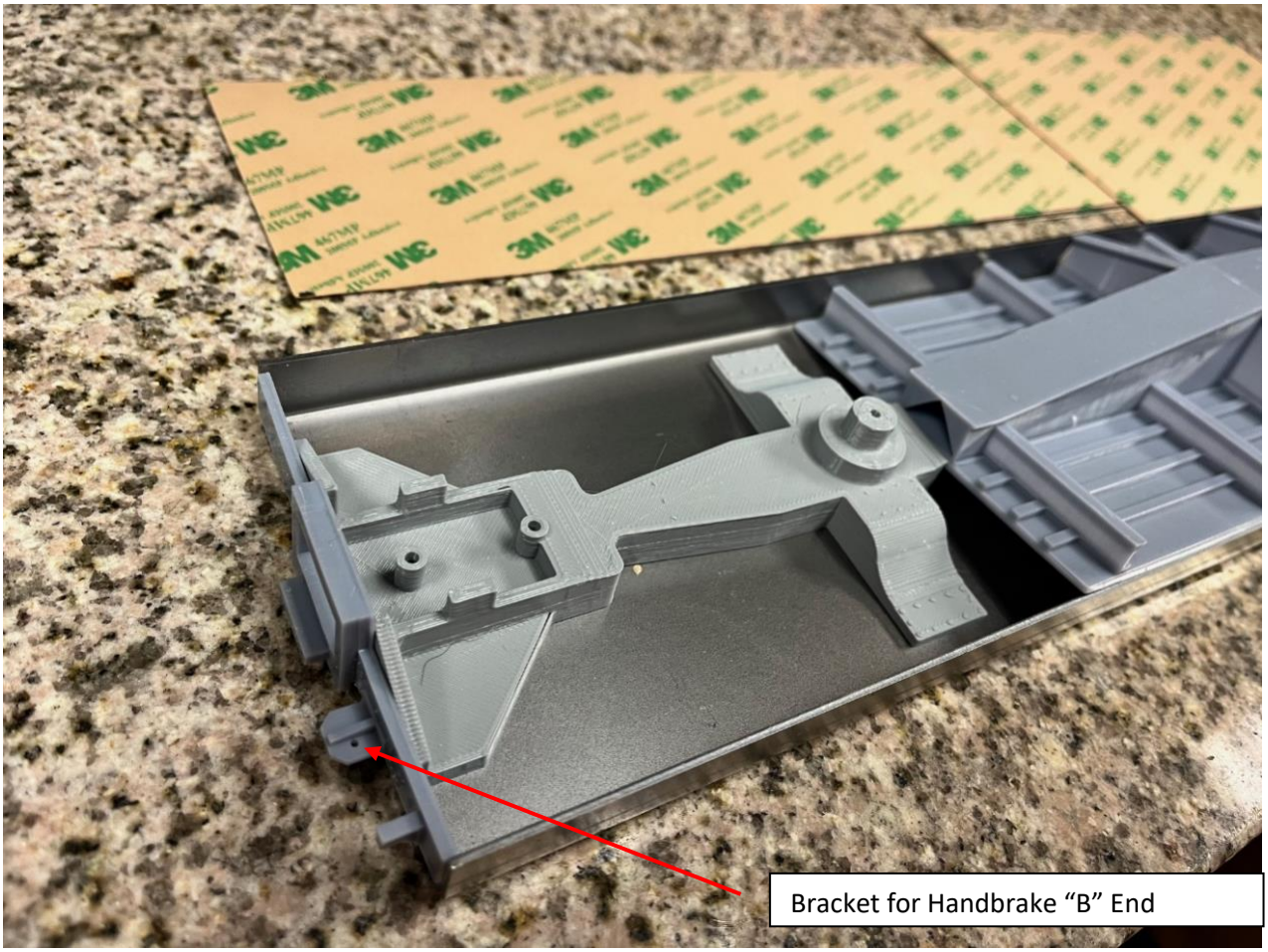

PHOTO 3: Detail Photo – Center Section of the Underframe

PHOTO 4: Detail Photo -- End of the Underframe of the Car (“A” End)

PHOTO 5, 6 & 7: Grab Iron Bending Fixture

PHOTO 8: Cut Lever Detail Photo

PHOTOS 9 & 10: Underside of F68 Flatcar Showing Brake Component Locations

PHOTO 11: View of Deck “A” End

PHOTO 12: View of Deck “A” End Finger Rack to Car Centerline

PHOTO 13 Centerline of Car to “B” End Finger Rack

PHOTO 14 “B” End Finger Rack to “B” End of Car

PHOTO 15 Underside of Finger Rack showing Magnets (White) and Space on Deck where Finger Racks are to be located

PHOTOS 16-20: Decal Placement