CLAIMS:

1. A method for fabricating a composite construction element comprising a plurality of objects embedded in a cast portion, the method using a computer-controlled additive manufacturing apparatus, the method including:

receiving, by the apparatus, computer instructions relating to a mould geometry corresponding with the composite construction element geometry;

moving the apparatus and selectively fabricating build material in specific locations corresponding with the mould geometry to fabricate a mould, the mould having one or more non-planar casting surfaces and a plurality of receiving portions arranged on the non-planar casting surfaces, the receiving portions dimensioned to receive and retain the plurality of objects in specific positions, and at least two of the receiving portions arranged to position respective objects in different orientations relative to each other;

positioning the plurality of objects in the receiving portions, thereby arranging at least two of the objects in the different orientations;

covering at least a portion of the one or more non-planar casting surfaces and at least a portion of each of the plurality of objects with a settable material; and

at least partially curing the settable material, thereby forming the cast portion having a respective one or more non-planar surfaces corresponding with the one or more casting surfaces and having the plurality of objects embedded therein.

2. The method for fabricating a construction element according to claim 1, wherein fabricating the one or more non-planar casting surfaces further

comprises fabricating the one or more non-planar casting surfaces having compound curved geometry.

3. The method for fabricating a construction element according to claim 1, wherein fabricating the one or more non-planar casting surfaces further comprises fabricating a plurality of non-planar casting surfaces, wherein at least two of the plurality of non-planar casting surfaces are arranged at different orientations relative to each other.

4. The method for fabricating a construction element according to claim 1, wherein the plurality of objects have a facing surface, and wherein positioning the plurality of objects further comprises positioning the facing surface against the respective receiving portion.

5. The method for fabricating a construction element according to claim 4, wherein each object comprises sidewalls extending from the facing surface, and wherein before positioning the plurality of objects in the respective receiving portions, the method further comprises shaping at least one sidewall of at least one object to be non-perpendicular to the facing surface, responsive to further computer instructions relating to a virtual intersection of the at least one sidewall with the one or more non-planar casting surfaces.

6. The method for fabricating a construction element according to claim 5, wherein shaping the at least one sidewall further comprises shaping all of the side-walls at the virtual intersection to be perpendicular to the one or more non-planar casting surfaces, thereby defining a consistent spacing between the sidewalls embedded in the cast portion.

7. The method for fabricating a construction element according to any one of claims 5 to 6, wherein the step of shaping the at least one sidewall further comprises cutting the block from one of a substantially planar panel and a substantially non-planar panel.

8. The method for fabricating a construction element according to any one of the preceding claims, wherein the step of fabricating the receiving

portions further comprises fabricating the receiving portions having geometry configured to engage the objects, and the step of positioning the plurality of objects in the respective receiving portions further comprises engaging each object with the respective receiving portion.

9. The method for fabricating a construction element according to any one of the preceding claims, wherein before covering at least a portion of the mould and the one or more objects with settable material, the method further comprises securing at least one web to at least two of the objects.

10. The method for fabricating a construction element according to any one of the preceding claims, wherein selectively fabricating the build material further comprises at least one of selectively depositing the build material and selectively milling the build material.

11. The method for fabricating a construction element according to any one of the preceding claims, wherein the method further comprises at least one of heating at least a portion of the mould to a temperature above a melting point of the build material to melt the at least a portion of the mould, and exposing at least a portion of the mould to a liquid configured to dissolve the at least a portion of the mould, thereby removing the at least a portion of the mould from the composite construction element.

12. The method for fabricating a construction element according to claim 11, wherein the method further comprises collecting the melted build material and recirculating the collected melted build material to the apparatus.

13. The method for fabricating a construction element according to any one of the previous claims, wherein the build material is a wax compound.

14. The method for fabricating a construction element according to any one of the preceding claims, wherein the step of covering the at least a portion of the one or more non-planar casting surfaces and the plurality

of objects with the settable material further comprises at least one of pouring the settable material onto the mould and the plurality of objects, and spraying the settable material onto the mould and the plurality of objects.

15. The method for fabricating a construction element according to claim 14, wherein the step of covering the at least a portion of the one or more non-planar casting surfaces and the plurality of objects with the settable material further comprises spraying a first settable material to form a first layer and spraying a second settable material to form a second layer.

16. The method for fabricating a construction element according to claim 15, wherein the first settable material is a composite material and the second settable material is a cementitious material.