CLAIMS

1. An assembly machine for manufacturing of reinforcement structures, such as rebar cages or meshes, comprising:

- a production area (2) extending in a longitudinal direction and in a transverse direction,
- a first loading unit (5) arranged relative to the production area (2), the first loading unit (5) being configured to load a number of rebar elements into the assembly machine (1),
- at least one moveable robot unit (14, 15) arranged relative to the production area (2), the at least one moveable robot unit (14, 15) comprising at least one robotic arm configured to be fitted with at least one tool, wherein the at least one moveable robot unit is configured to move along the production area (2) in the longitudinal direction, **characterised in that** the assembly machine (1) further comprises:
- a plurality of support arms (3) arranged relative to the production area (2), each of the support arms (3) extending in the transverse direction,
- at least one support element (4) configured to hold a number of transverse rebar elements (10) in at least one fixed position in the longitudinal direction, the at least one support element (4) being arranged relative to the support arms (3),

wherein the first loading unit (5) is configured to load a number of longitudinal rebar elements (6) into the assembly machine (1) in the longitudinal direction.

2. The assembly machine according to claim 1, **characterised in that** the at least one moveable robot unit comprises a first moveable robot unit (14) with a first robotic arm and a second moveable robot unit (15) with a second robotic arm, the first robotic arm being configured to fit with a first tool and the second robotic arm being configured to fit with a second tool.

3. The assembly machine according to any one of claims 1 or 2, **characterised in that** the plurality of support arms (3) are configured to move between a retracted position and at least a loading position or a holding position in at least an orthogonal direction.

4. The assembly machine according to claim 3, **characterised in that** at least one of the support arms (3) comprises a first part (21) and a second part (22), where the first part

(21) comprises means for locally moving the longitudinal rebar elements in at least the transverse direction.

5. The assembly machine according to claim 3 or 4, **characterised in that** at least one of the support arms (3) comprises at least one set of rollers for passively or actively moving the longitudinal rebar elements (6) in at least the longitudinal direction.

6. The assembly machine according to any one of claims 3 to 5, **characterised in that** the plurality of support arms (3) comprise at least one set of first support arms (3a) and one set of second support arms (3b), the first support arms (3a) or the second support arms (3b) are configured to be moved individually and/or synchronously relative to each other.

7. The assembly machine according to any one of claims 1 to 6, **characterised in that** the assembly machine (1) further comprises a second loading unit (13) configured to load the transverse rebar elements (10) into the assembly machine (1).

8. The assembly machine according to claim 7, **characterised in that** a sub-assembly station (8) is arranged relative to the second loading unit (13), the sub-assembly station (8) is configured to assembly the transverse rebar elements (10) into a number of stirrup units (12).

9. The assembly machine according to any one of claims 1 to 8, **characterised in that** the production area (2) is divided into a number of sections, wherein at least one set of support arms (3) is arranged in each section.

10. The assembly machine according to any one of claims 1 to 9, **characterised in that** the longitudinal rebar elements (6) and/or the transverse rebar elements (10) have a diameter of 16 millimetre or more.

11. A method of manufacturing reinforcement structures, such as rebar cages or meshes, comprising:

- providing an assembly machine (1), the assembly machine (1) comprising a production area (2) extending in a longitudinal direction and in a transverse direction, where a

plurality of support arms (3) and a plurality of support elements (4) are distributed along the production area (2), and the assembly machine (1) further comprises at least one moveable robot unit (14, 15) with at least one robotic arm arranged relative to the production area (2), the at least one robotic arm being configured to be fitted with at least one tool,

- loading a plurality of transverse rebar elements (10) into the support elements (4) of the assembly machine (1),
- further loading a plurality of longitudinal rebar elements (6) onto the support arms (3) of the assembly machine (1) in the longitudinal direction,
- moving the at least one moveable robot unit (14, 15) along the production area (2), and securing the longitudinal rebar elements (6) to the transverse rebar elements (10), e.g. by a welding or binding process, using the at least one moveable robot unit (14, 15).

12. The method according to claim 11, **characterised in that** the transverse rebar elements (10) are pre-assembled into a number of stirrup units (12), e.g. via another robot unit (11) with a robotic arm, which are then loaded into the support elements (4).

13. The method according to claim 11 or 12, **characterised in that** the plurality of support arms (3) comprise at least one set of first support arms (3a) and one set of second support arms (3b), at least the first support arms (3a) are moved into a first holding position before a number of first longitudinal rebar elements (6a) are loaded onto the first support arms (3a).

14. The method according to claim 13, **characterised in that** the method further comprises the steps of:

- further moving the second support arms (3b) into the first holding position, before
- loading the first longitudinal rebar elements (6a) onto at least one of the first and second support arms (3a, 3b).

15. The method according to claim 13, **characterised in that** the method further comprises the steps of:

- moving the first support arms (3a) out of the first holding position,
- further moving the first support arms (3a) or a number of second support arms (3b) into at least a second holding position, before

- loading at least a number of second longitudinal rebar elements (6b) onto the first or second support arms (3a, 3b).

16. The method according to any one of claims 13 to 15, **characterised in that** at least one of the first or second longitudinal rebar elements (6a, 6b), when in the first or second holding position, is further moved in the transverse direction into position relative to the transverse rebar elements (10) prior to being secured to the transverse rebar elements (10).

17. The method according to any one of claims 11 to 16, **characterised in that** the assembly machine (1) further comprises a first moveable robot unit (14) with a first robotic arm, the first robotic arm being fitted with a first tool, and a second moveable robot unit (15) with a second robotic arm, the second robotic arm being fitted with a second tool, wherein the first and second robot units are moved synchronous or independently along the production area (2).

18. The method according to any one of claims 12 to 17, **characterised in that** the transverse rebar elements (10), preferably the pre-assembled stirrup units (12), are loaded into the support elements (4) using the at least one moveable robot unit (14, 15).

19. The method according to any one of claims 11 to 18, **characterised in that** the method further comprises the steps of:

- assembling a first part of the reinforcement structure, wherein one portion (17a) is left unassembled for assembling a second part of the reinforcement structure,
- moving the first part in the longitudinal direction from a first position to a second position,
- further assembling at least the second part of the reinforcement structure in continuation of the first part, wherein the unassembled portion (17a) of the first part is integrated into the second part.