	NORTH CAROLINA DEPARTMENT OF LABOR	**No. 22-1**
	OSH DIVISION	**Date: 10/2009**
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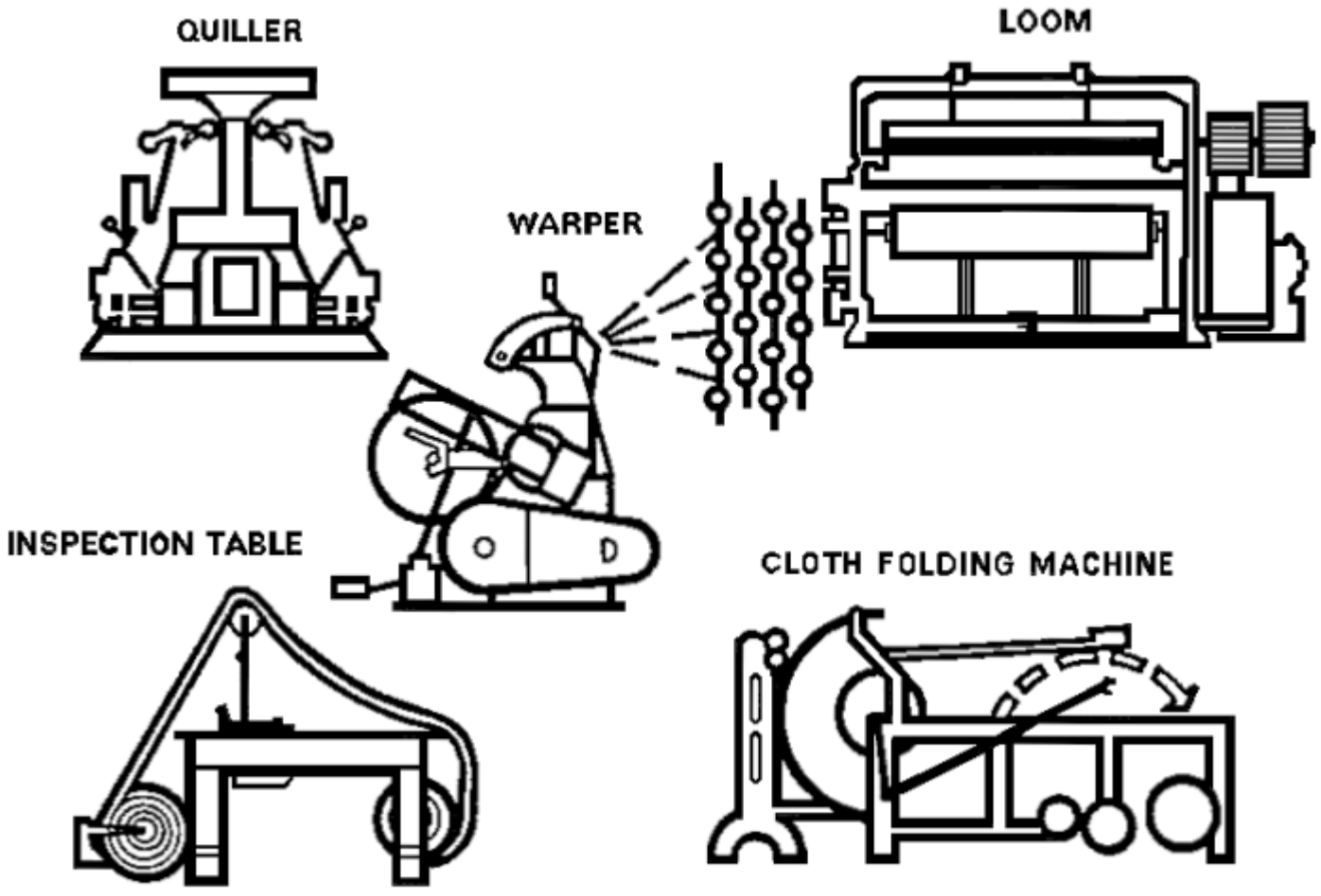
Industry: **Textiles**	Sub-Group: **Weaving**
SIC: **2231 and 2241**	NAICS: **313210, 313311, 313312 and 313221**

PROCESS DESCRIPTION: Weaving is the process of forming fabric on hooks by interlacing warp (lengthwise yarns lengthwise) and filling (crosswise yarns, weft or picks) with each other. Filling is fed from cones, bobbins or quills which carry the filling picks through the shed of the loom. Filling may be inserted into the material with a shuttle or by a shuttleless loom. The three basic weaves are plain, twill and satin. All other weaves, no matter how intricate, employ one or more of the basic types in their composition. There are many variations that produce different types of fabric surfaces and fabric strengths.

PROCESS FLOW:



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Hazards Analysis

Major Hazards			Other Hazards		
Location	**Item**	**Hazard**	**Location**	**Item**	**Hazard**
Throughout	Mechanical power transmission apparatus	Amputations and crushed limbs from contact with gears, shafts, pulleys, belts, chains and sprockets	Weaving	Lack of lockout on looms Lack of guard rails above Jacquard looms Cotton dust	Amputations and crushed limbs from looms inadvertently starting while cleaning, adjusting or maintenance is being performed Falls from high overhead work areas Inhalation, Byssinosis
Quilling, cloth inspection	Points of operation such as bobbin conveyor nip points, in-going rolls on inspection tables	Amputations and crushed limbs from contact with moving equipment	Throughout	Housekeeping	Slips, trips and falls
Warping or beaming	Lack of interlocked bar guard in front of moving beam	Amputations and crushed limbs from contact with revolving beam and stationary parts	Cloth Inspection	Spot removing	Eye and skin irritation and inhalation of vapors
Weaving	Inadequate shuttle guard Noise	Bodily injury from shuttles flying out of the shed Hearing loss	Packing	Fastening and tying cartons	Eye and face lacerations
Throughout	Combustible materials Electrical equipment	Burns and entrapment Shock and electrocution	Weaving, warping and packing	Moving goods by hand	Back injuries, strains and hernias
			Warping or beaming	Fans	Amputations and crushed limbs from contact with fan blades

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Key OSHNC Standards

Reference	29 CFR 1910 - General Industry Standards
NCGS 95-129	General duty clause - ergonomics
Subpart D	Walking and working surfaces
Subpart E	Exit Routes, Emergency Action Plans, and Fire Prevention Plans
Subpart	Personal protective equipment
Subpart O	Machinery and machine guarding – where 1910.262 does not apply
Subpart S	Electrical
1910.95	Occupational noise exposure
1910.141	Sanitation - housekeeping
1910.147	Control of hazardous energy (lockout/tagout) – where 1910.262 does not apply
1910.262	Textiles
1910.	Air contaminants
1910.1043	Cotton dust
1910.1200	Hazard Communication

Inspection Analysis

The inspection in the quilling department must begin by checking for properly guarded machinery (power transmission apparatus, points of operation and in-going nip points). This procedure must be followed throughout the operation. In the warping or beaming department, check for interlocked gates on warpers exceeding 450 yards per minute. Looms in the weave room should be equipped with shuttle guards. Lockout procedures must be checked by interviewing fixers and supervisors. Also, noise levels must be surveyed and the hearing conservation program analyzed. Guard rails are required on all runways above or adjacent to looms. In the cloth inspection department, check the ingoing nip points on inspection machines. The use of spot removers must be closely examined. Materials handling equipment in the packing and shipping departments must be checked for guarding and proper maintenance. Material handling equipment operators must be trained and vehicles checked before use.

Other Pertinent Comments: Other looms operate by interlacing a series of vertical, parallel threads (the warp) with a series of horizontal, parallel threads (the filling). The warp yarn from a beam pass through the needles of reed, and the filling is shot through the shed or warp threads by means of a shuttle or other device and is settled in place by the reed and lay. The woven fabric is wound on a cloth beam. The principal elements of the loom are the shedding, picking and beating up devices. In shedding, a path is formed for the filling by raising some warp threads while others are left down. Picking consists of projecting the filling yarn from one side of the loom to the other. Beating-up forces the pick, which has just been left in the shed, against the fill of the fabric. This is accomplished by the reed which is brought forward with some force by the lay.