

armstrong-spallumcheen



the power of community involvement

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Armstrong-Spallumcheen Arena

The Power of Community Involvement

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Introduction

The City of Armstrong, British Columbia and its neighbouring Township of Spallumcheen are situated between the sunny, rolling Okanagan Valley and the cooler, forested Shuswap Valley. (The name *Spallumcheen* is derived from the First Nations term meaning "beautiful valley.") Until recently, indoor skating activities for the 10,000 city and township residents took place at a 55 year-old facility. In the spring of 2004, a design team was retained to undertake a feasibility analysis and develop preliminary designs for a new multi-use facility, anchored by an NHL-sized ice surface, to be situated on the Armstrong Fairgrounds (**Figure 1**).

The facility's proximity to the existing swimming pool, skateboard park and baseball diamonds create a recreational area that will serve the needs of the community for many years to come. Sixty-two parking stalls are located beside the facility and additional parking is available at the adjacent Fairgrounds for special events.

In just 18 months, planning, design and construction resulted in the Fall 2005 opening of the facility, comprised of the following:

- One NHL standard ice surface (85' x 200')
- Seating to accommodate 700 spectators (300 rink-side and 400 at the concourse level)
- One dedicated team dressing room, four conventional dressing rooms, a training dressing room, and a referees' change room
- Administration offices and ticketing facilities
- Entry lobby
- Concourse level viewing, complete with a 'barrier-free' viewing area and a concession area
- One multipurpose room
- An entry plaza and a breeze-way

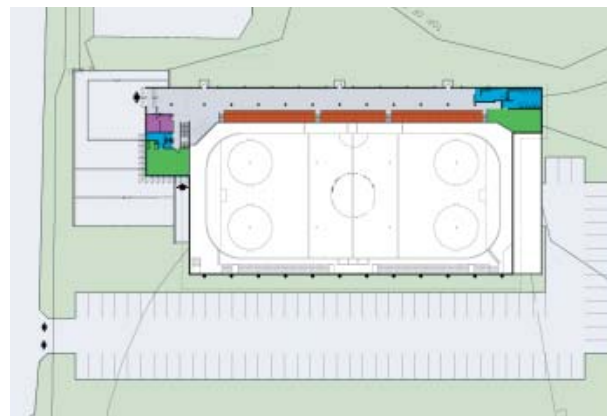


FIGURE 1 Site plan



There are several unique aspects to this project. The most obvious is the creative use of structural wood products to create a bright, upscale recreational environment. Less obvious but crucially important to the quality of the finished product was an inspiring level of

community involvement for planning and for securing financial and material contributions. The combination of strong community involvement with a strong and flexible design team resulted in a modern, compact design (**Figure 2**). Although Armstrong is surrounded by some of the best farmland in British Columbia, it is also in close proximity to rich forest for which British Columbia is renowned. For this reason, Armstrong is a wood products manufacturing centre for both plywood and lumber – a fact that played a large role in the design and cost effectiveness of the facility.

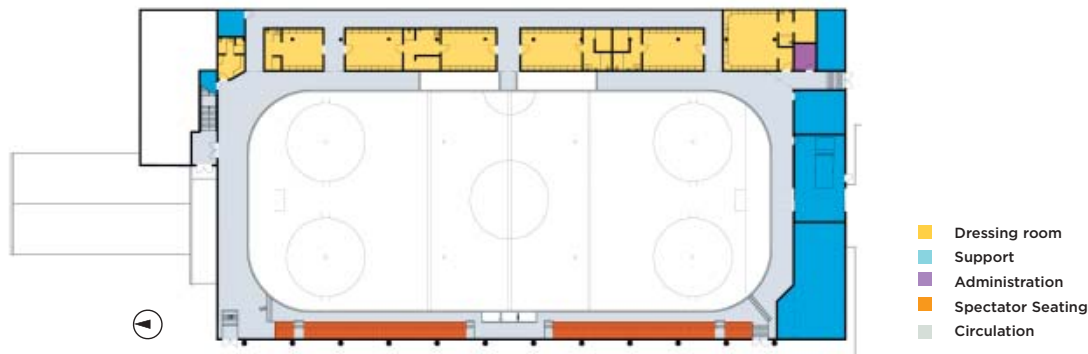


FIGURE 2 Lower Floor Plan

The final cost for the facility was \$5,500,000 (2005 dollars) including design fees. Of this amount, the local general community donated approximately \$200,000 in cash and \$300,000 in products and supplies. The parking lots, services to the building, and road and sidewalk upgrades were completed through City of Armstrong capital works and are not included in the final cost.



Community Involvement

From the outset, the community leaders promoting and guiding the acquisition of a new recreational facility considered using the wood products made in and around Armstrong. There were several reasons for this:

- The performance of wood construction in the cold, damp arena environment is well established – there are several high-end arena facilities of wood construction in British Columbia that have proven performance.
- Planners wanted the facility to showcase wood construction products manufactured locally and known for their quality and performance.
- There was a strong possibility of minimizing the project cost through the donation of time and materials.
- Planners wanted an arena that was different and welcoming.

Once community planners had established an action plan, a design team was assembled that was experienced in wood design and open to the idea of incorporating in-kind contributions of wood and other building materials wherever possible.

A key part of the design process was a two-day design forum to consider the outcome of public meetings and establish needs, wishes, possibilities and realities. The two-day workshop involved the designers, architects, and the two mayors and groups of council members of the Arena Committee. At the end of the session, all present had agreed to a conceptual design and the project was underway. As one participant remarked, “This joint meeting of all of the parties concerned was a great workshop, as everyone got to know everybody, and all of the ideas were captured in the initial design sketches.”

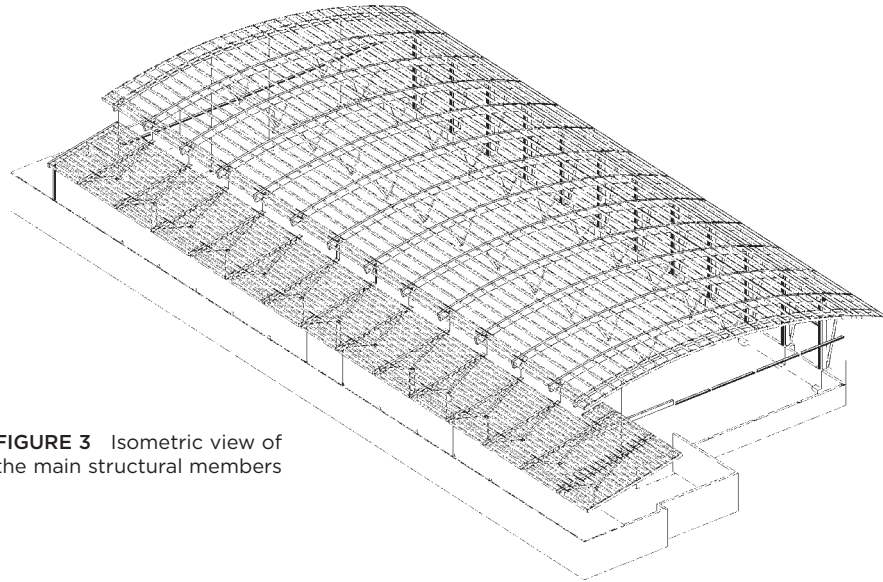


FIGURE 3 Isometric view of the main structural members



Framing Strategy

Structure

The construction of the Armstrong / Spallumcheen Arena showcases locally manufactured wood products. The main roof support above the ice / playing surface is provided by 200 x 750 mm (8" x 30") glue-laminated beams. Intermediate support of the long beams is provided by two steel legs supported by a 35 mm structural cable (**Figures 3 and 4**). One end of the beams is supported by steel frames that cantilever over the seating area. The supports also raise the level of the underside of the roof by 1.9m (6.2') to provide the additional clearance height desirable for playing lacrosse. Other structural elements include:



- 89 x 240 mm (4" x 10") Douglas fir roof purlins and 25 mm (1") Douglas fir plywood roof sheathing. The plywood provides an inexpensive finishing material that reflects light to the playing surface while, at the same time, providing diaphragm strength to the roof.
- 400 mm (16") diameter Douglas fir log columns (outboard of the building envelope)
- 38 x 240 mm (2" x 10") Douglas fir stud infill endwalls, 38 x 190 mm (2" x 8") Douglas fir stud infill sidewalls, and 15.9 mm (5/8") Douglas fir plywood wall-sheathing and 150 x 356 mm (6" x 14") Parallam® posts.



The arrangement of glulam beams, cables and the end supports is shown in **Figure 4**. This arrangement minimizes the volume of the building while providing the required ceiling clearance over the play surface.

Exterior Finishes

- Pre-finished engineered wood siding (25-year guarantee).
- Clear fir wood-frame windows (locally manufactured)

Interior Finishes

- Roof: The underside of the Douglas fir plywood is left exposed
- Walls: Pine boards will be used to finish the inside walls at the end of the 2006 hockey season.

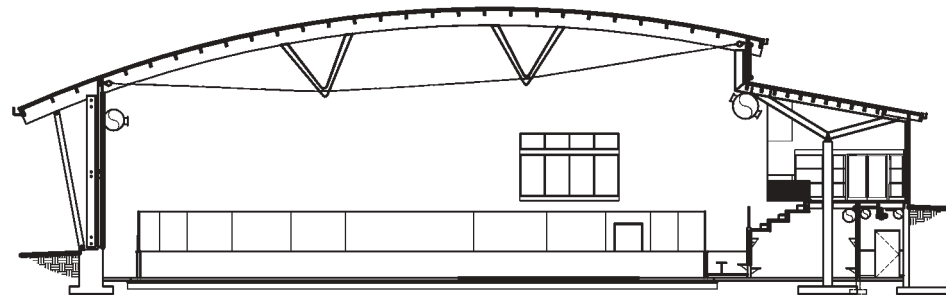


FIGURE 4 Cross-section through the ice surface and seating area

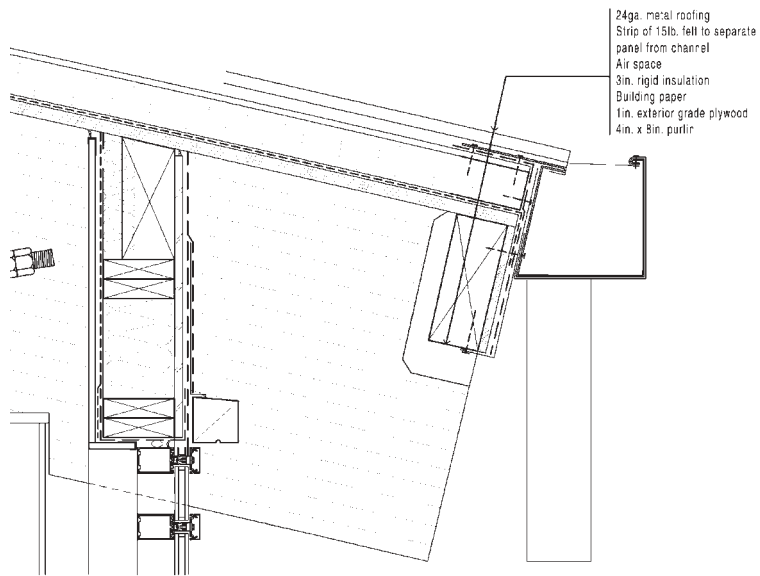


FIGURE 5 Section through roof structure over the spectator seating area

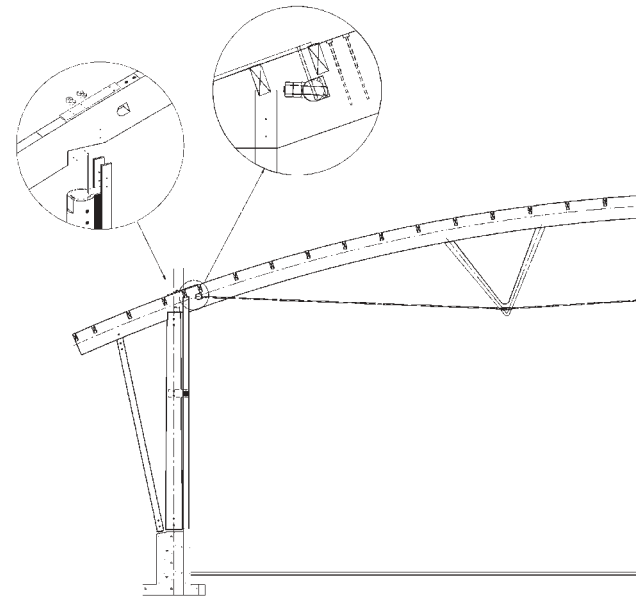


FIGURE 6 Connection details for glulam beams and steel cables



Roof

The roof (**Figure 5**) is comprised of metal roofing and 75 mm (3") of rigid foam insulation supported by the plywood decking.

Connections

All the miscellaneous structural steel was tendered as part of the supply and install glulam package. In addition, the wood machining for the connections was done in the factory. This arrangement simplified shop drawings, facilitated wood to steel connections, and sped erection. **Figure 6** shows two aspects of the steel cable/glulam connection details.

Fire Safety

The Armstrong / Spallumcheen Arena is a one-storey building that has an area of 2,442 m² (26,272 ft.²) and is fully sprinklered. As such, it meets the requirements of the BC Building Code and the National Building Code of Canada for Group A, Division 3 (Arena-type) occupancies in one-storey, sprinklered buildings. This classification and building design permits either combustible or noncombustible construction, or some combination thereof, for a one-storey sprinklered building provided it does not exceed 7,200 m² (77,460 ft.²) in area. In this case, heavy timber construction was chosen for the support of the thicker plywood roof deck. However, light weight trusses or other wood members and regular wood sheathing for the roof deck could also have been used.





Special Features

Lighting

The user requirements specified that for 60% of the year (the winter months) the arena would have an ice surface for hockey and skating. For the other 40% of the year, the ice would be removed and the concrete surface would be used for lacrosse and special events. The emphasis on lacrosse required some special features. First, the roof clearance above the ice surface was increased to 7.6 m (25') feet from the 5.5 m (18') usually provided over hockey arenas. Secondly, special lighting was provided in consideration of the fact that lacrosse players are often looking upwards in search of the ball. Low glare lighting was installed and the plywood ceiling was left unfinished so that its bright, light surface would reflect light down to the playing area.

Mechanical

Although the capability of dehumidification was built into the heating / cooling system, it is anticipated that moisture accumulation inside the building will not be a problem. Due to the low thermal conductivity of wood, dripping onto the ice surface is not a problem as it can be with steel construction. This potential problem is also helped by the fact that, to accommodate lacrosse and other events, for almost five months of the year, the ice surface will not be in place.



Donated Materials

This project incorporated a significant amount of community contribution for building materials and labour. In so doing, it stands as a model to small communities for acquiring quality facilities. In addition to lumber and plywood, electrical and mechanical materials and equipment was donated. This proved to be a strong motivator for community spirit and economics, but certainly posed some special challenges for the architect / project manager. For one thing, there was a need to ensure that the materials provided met the intent of the specifications - the architect needed to ensure quality was not compromised in any way. Secondly, vigilance, coaxing and sound project management was required to ensure the delivery and installation of donated materials did not compromise the tight construction schedule.

In the case of the Armstrong- Spallumcheen Arena, the donation of locally-manufactured plywood was a perfect fit. Its incorporation into the design made use of plywood's strength, clean appearance and ease of installation.

Conclusion

The Armstrong-Spallumcheen Arena is another example of how wood is an excellent construction material for arenas. It meets structural, fire, acoustical, and thermal code requirements while providing an architectural flare that sets the arena apart from others. In the case of the Armstrong-Spallumcheen Arena, curved glulam beams and plywood roof sheathing provide a bright, pleasing appearance that enhances the amount of light on the playing surface.

In addition to the inventive and resourceful use of wood products, this project is also exemplified by the formation of a design team familiar with wood and enthusiastic about using it for this project. A two-day design forum was used to develop user requirements, design concepts, and a construction strategy that included a high degree of community involvement and the incorporation of a significant quantity of donated materials. In this way, the planning, design and construction of the Armstrong-Spallumcheen Arena serves as a model for smaller communities to procure unique buildings that reflect their values, budgets and local talents and resources.



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Septra Project Management Ltd.

Structural Engineers

Fast + Epp

Mechanical Engineering

Earth Tech (Canada) Inc.

Electrical Engineering

Keen Engineering Co. Ltd.

Civil Engineering

Earth Tech (Canada) Inc.

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