IOU Coaching Certification

Level 2: Competitive

Section 3: Statistics

Box Score Statistics

- Designed to be easy to track
- Can offer insight, but not answers
- Readily available after each game

Goals

- Object of the game, good to know who is succeeding
- Important to remember context
  - Easier to score from penalty shots and power play
  - Harder to score with very defensive assignment
- Luck is huge factor
  - Players go on streaks
  - Scoring or not scoring does not indicate process

Assists

- Any time a player passes, chips, or deflects the ball to a teammate who scores, shoots a rebound that leads a teammate to score
- Good passers tend to get lots of assists
- Passer doesn’t decide if the shooter scores. Good or bad teammates can throw off stat

Shots

- Indicate aggressive play
- More shots is more likely to score
- Can indicate process more than just goals

Blocked Shots

- Rough indicator of defense
  - Every shot blocked is a goal prevented
  - Can indicate effort, positioning, and defensive involvement
- Remember limitations
  - Can be indicative of poor possession (can’t block shots when you have the ball)
  - Much of defense occurs off-ball and will not appear in on-ball events
  - Value varies by position (blocked shot at point leads to counterattack, blocked shot at goal stops certain goal, blocked shot in corner less valuable)

Free Hits Taken and Errors

- Can be used to evaluate how consistent a player is at taking free hits
- Not very granular
- Doesn’t take into account team strategy
- Good players will make few errors- not much sample size

Face-Offs

- Every face-off won is possession gained
  - Frequent opportunity to win the ball
  - Good face-off takers can be important to know about in key situations
  - Allows team to create set plays
  - Can mitigate damage from free hits lost
- Remember limitations
  - Many possessions do not come from face-offs
  - Chaotic even for best face-off takers: any player can win the ball sometimes

Foul Minutes Drawn

- Creates scoring chances
  - Penalty shot is huge scoring chance
  - Powerplay sees much higher chance of scoring than opponent
- Sign of aggressive play
  - Aggressive play on the ball forces defenders to make mistakes or cynical plays
  - Aggressive play on opponents aggravates them into committing fouls

Sin Bin Time

- Indicates foul play
  - Poor self control
  - Poor decision making
- Direct cause of scoring chances against
- Can be less of a problem depending on role
  - Agitators will naturally take more
  - Aggressive defenders will take more
  - Players covering difficult opponents will take more

Commonly Tracked Statistics

- Often used by leagues on their statistics pages
- Offer more insight into game performances over a season or career than individual box scores
- Can be valuable without adding the extra work of tracking your own statistics

Points

Player Stat

- Goals + Assists
- General measure of offensive impact

Game Winning Goals

Player Stat

- Player who scored the goal which put their team ahead to win is credited with game winning goal
- Noisy statistic, but can be a good measure of “clutch” performance

Block Ratio

Player Stat

- Ratio of blocked shots to goals against for a particular player
- If a player has not been scored on yet, ratio is calculated as though they have allowed one goal
- Higher ratio is better
- Good measure of defensive impact

Penalty Stop Rate

Player Stat

- Penalty shots defended without a goal against / all penalty shots defended
- Helps determine who should be defending penalty shots

Penalty Differential

- Measures net impact of player’s discipline on game
- Foul Minutes Drawn - Foul Minutes
- Positive value is better, higher number is best
- Negative value is worse, lower number is worst

Shooting Percentage

- Goals / shots
- Can give an idea of how good a player is at shooting, how well they are putting themselves in good scoring positions
- Can give an idea of how lucky or unlucky a player has been given historical shooting percentages

Shutouts

- If a player plays an entire game without being scored on they are given a shutout
- Shutouts are much more common among forwards and halfbacks than among fullbacks, since the entire team needs to not be scored on in order for a fullback to get a shutout

Free Hit Percentage

- Percentage of free hits taken which are not errors
- As close to 100% as possible is best

Tracking Your Own Statistics

- Can be a useful way to gain an edge against opponents and gain understanding of team’s performance
- Requires video footage or a dedicated stat-tracker at the game
- Exact choice of stats tracked is matter of personal preference

Identifying Goals of Gameplan

- Possession
- Physicality
- Creativity
- Defensive Solidity
- Ball-Skill Execution
- Pace

Measuring Possession

- Team without ball cannot score
- Team with ball more has more chances to score

Shots For%

Player Stat

- Tracks all of the shots for both teams while a player is on the field. Shots For% = Shots For / (Shots For + Shots Against)
- Indication of control over game
- 50% is equal game
- Players with more defensive roles may see negative (under-50) possession
- <40% generally bad, >60% generally good

Rebounds

Player Stat

- Any time a player collects a shot after it has been blocked or hits the post, they are credited with a rebound
- Good proxy for effort and positioning
- Every rebound is theoretically a possession won
- Position-dependent: Sweepers will collect more rebounds than forwards

Free Hits Won

Player Stat

- Create territorial value for team
  - Every free hit won is a chance at territory and possession
  - Allows for line changes, improving matchup possibilities
- Remember limitations
  - Over-encouraging could lead players to take bad shots
  - Could lead to players afraid to put ball out of bounds (too good for opposing team)

Time on Attack

Team Stat

- Amount of time ball spends in offensive half and under control
- More time is more chances to score
- Indicates complete control of territory and possession

Shot Differential

Team Stat

- Amount of shots on goal the team has - amount of shots on goal opposing team has
- Reflects level of control over the game
- 0 is equal game
- Can be impacted by pace of play- team which outshoots their opponent 4 to 2 has +2, while opponent who outshoots their opponent 10 to 7 has +3. Tactical goals (high-event or low-event play) should factor into evaluation

Measuring Physicality

- More physical teams can wear out opponents
- Physicality is good proxy for effort

Hip Checks

Player Stat

- When a player uses a hip-check to make an opponent lose possession of the ball, they are credited with a hip check
- Indication of hip checking skill, aggression, bravery, and positioning
- Potentially an indicator of bad possession (cannot hip check opponents while we have the ball)

Screened Shots

Player Stat

- When a player is obscuring the vision of a defender while a teammate takes a shot and the shot lands on goal, they are credited with a screened shot
- Implies ability to hold ground and aggressive intent to screen
- Requires teammates to land shots on goal

Offsetting Penalty Minutes

Team Stat

- When players on both teams commit infractions that result in both players being sent to the sin bin at the same time for the same amount of time, both teams are credited with offsetting penalty minutes
    - Easiest method to achieve this is with a fight, which causes both players to receive 12-minute offsetting striking majors
    - Another common method is to deliberately foul an agitated player in the hopes that they retaliate
- Has tactical value for some teams but not others
    - Fewer players on the field increases chances of goals, especially important while trailing, but good for any team that thinks they are faster than opponents
    - Offers chance to “trade” taking off key opponent with player who is not as important to team in the moment (i.e. trade back for opposing forward if defending a lead to put opponent in worse position to score)
- Implies a level of commitment, aggression, and bravery from team
- Indicates negatives as well
    - Increased injury risk for players
    - Potentially means bad discipline
    - May sacrifice power play opportunities to try and achieve
    - Bad news for teams which do poorly at 4v4, 3v3, or 2v2

Measuring Creativity

- More creative teams make better chances
- Generally measured by passing statistics

Shot Assists

Player Stat

- Same as assists, but for all shots on goal
- More statistical volume, doesn’t rely on shooter skill as heavily
- Doesn’t necessarily tell if the player has created good shots or not

Dump, Carry, and Pass Entry%

- Every time a player sends the ball into the offensive zone, that is an entry
- All entries are either passes, carries, or dump-ins
- Players who bring the ball in themselves- carry
- Pass to a teammate in the offensive zone from the neutral zone- pass
- Pass to self or teammate where player has to chase onto ball from neutral zone, or shot on goal- dump
- No % is necessarily “good” or “bad” but can show style of player
  - Pass + dump > 70%: ball-moving player
  - Pass + carry > 70%: aggressive attacker
  - Dump + carry > 70%: north-south player

Shots inside%

Team Stat

- A shot from within stick's reach (stick and arm) of goal crease is an "inside shot," all other shots are "outside shots"
- Shots inside% = Inside Shots / (Inside Shots + Outside Shots)
- Indicates ability to create good scoring chances

Measuring Solidity

- Teams which give up only poor shots are less likely to be scored on

Shots Against Rate

Player Stat

- Shots Against Rate = (Shots Against / Minutes Played) * 50
- Useful for measuring defensive impact of non-sweepers
- Indicates ability to take away opposing scoring chances by any means (lower number is better)

True Foul Minutes Taken

- Foul Minutes Taken - (4*First Fouls)
- Adjusts the foul minutes taken in order to better estimate impact of a player’s fouls on the team’s defense

Blocks in Play%

Player Stat

- (Shots blocked which result in ball staying in play) / (all shots blocked)
- Measures player’s ability to not give up free hits
- Players will still need to put the ball out of play sometimes
- Not necessarily important if team is good at face-offs

Blocking%

Player Stat

- Any chance a player could theoretically have blocked a shot, or were the last player between a shooter and the goal, is a Blocking Opportunity
- Blocking % = Blocked Shots / Total Blocking Opportunities
- Better indicator of shot blocking ability than simple block numbers

Adjusted Shutouts

Player Stat

- Players in different positions have different opportunity to be scored on, so a shutout does not have the same value to each player
- Crude adjustment is based on position
  - Forward: AdjShutouts = Shutouts / 3
  - Halfback: AdjShutouts = Shutouts / 2
  - Fullback: AdjShutouts = Shutouts
- Better adjustment is based on playing time
  - AdjShutouts = Shutouts / 50 * minutes played

Keeping Shots Outside%

Team Stat

- A shot from within stick's reach (stick and arm) of goal crease is an "inside shot," all other shots are "outside shots"
- Keeping Shots Outside% = Outside Shots / (Inside Shots + Outside Shots)
- Indicates ability to force opponents to settle for worse shots

Foul Goal Rate

Team Stat

- Take the number of goals allowed from penalty shots and when the team is shorthanded, and divide them by the total minutes of shorthanded time (5 or 10 per foul)
- Good measure of team defensive skill, especially for more physical teams who might take more fouls
- May have more marginal gains from trying to commit fewer fouls

Measuring Ball-Skill Execution

- Looking for consistency over time
- Looking for repeatable skills

Shots Through%

Player Stat

- Shots Through % = Shots on Goal / All Shots Attempted
- Indicator of a player’s ability to create scoring chances from shots

1v1 Carries

Player Stat

- Any time a player with the ball has a defender between them and the goal, then gets around them such that they are now between that player and the goal
- Indicates good ball skill and aggressive play
- Good passers may do this rarely
- Dump and chase heavy players may do this rarely

Passing %

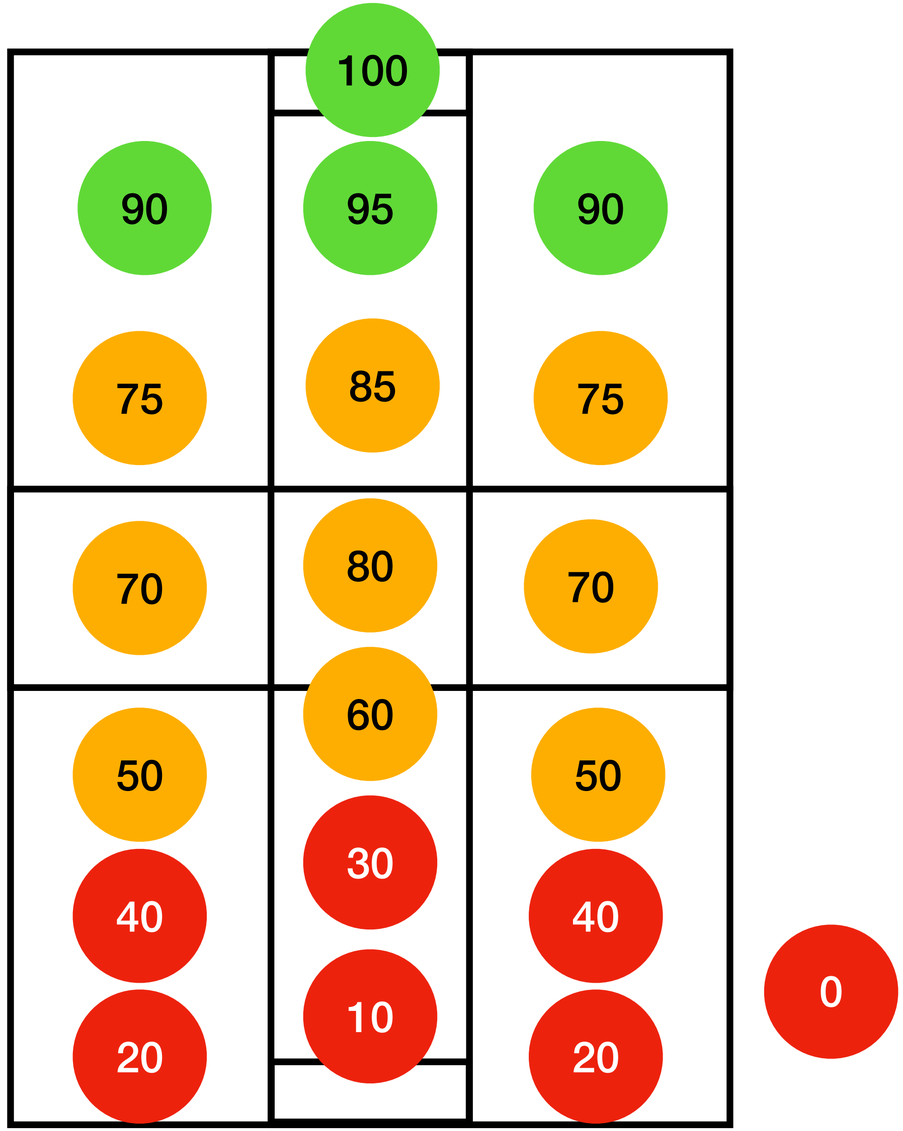
Player Stat

- Passing % = Passes completed / Total pass attempts
- Can indicate good ball control and impact on possession
- Players who try to aggressive passes may have a lower percentage

Free Hit Rating

Player Stat

- Measure player score for each given free hit, based on the ball's position on the field
- Average these into a rating
- Gives good measure of player's consistency and quality at free hits
- Out of bounds- 0
- Inside opposing crease- 100
- Value of center square can be adjusted depending on coach's tactical preference



Power Play Scoring Rate

Team Stat

- Power play Scoring Rate = (Goals Scored on Power play - Penalty Shot Goals) / (Total Power Play Time) * 50
- Indicates ability of team to capitalize on power play opportunities

Measuring Pace

- Actual running speed is not relevant- what matters is playing quickly
- Look for ways to measure pace that can be improved by either physical improvements or improved decision making

Dump-in Recoveries

Player Stat

- When the ball is sent as an area pass over 2 lines, an offensive player who recovers the ball is credited with a dump-in recovery
- Good indicator of sprint speed, effort, teamwork, and timing
- Forwards are more likely to rack up offensive recoveries, Fullbacks are more likely to rack up defensive recoveries, Halfbacks may not get many due to position on the field

Average Shift Length

Player Stat

- Players who sprint harder will tire more quickly, taking shorter shifts
- Role played, team tactics, and fitness level have an impact and can muddy any attempt at analysis

Shot Rate

Player stat

- If playing time statistics are available, add together all shots for both teams while a player is on the field, divide it by the number of minutes a player was playing, then multiply by 50
- Indicates how “fast” a player is playing
- Can be useful for putting together forward pairs: fast players like to play together, methodical players like to play together
- Can identify low-event players who are more useful when a team is defending a lead

Odd-Man Rushes

Team Stat

- When the offense has more players in the offensive zone than the defense and controls the ball, they are said to have an odd-man rush
- Indicates good buildup play and fast passing or carrying

Analyzing Trends

- Be aware of sample sizes
- Establish baselines to compare against
- Always look for context in game film: why are the statistics the way that they are?

Understanding Luck

- Unfortunate part of sport and life
- Luck regresses in the aggregate, neither good luck or bad luck is sustainable
- Some things that appear to be luck are skill, some things that appear to be skill are luck
- Beware of gambler’s fallacy: past luck does not predict future luck

Measuring Luck

- Requires baseline rates
- May have underlying causes (injury, player improvement) that muddy statistics

Missed Foul Calls

Player Stat

- Any time a player commits foul-worthy behavior and is not called for a foul, they get one missed foul call
- Any time a player receives a foul but does not draw a foul, they get one missed foul call
- Indicator of luck in foul minutes drawn and sin bin time
- Very subjective statistic

Shooting Percentage

Player Stat

- Shooting Percentage = Goals / Shots
- Players tend to have an “average” shooting percentage for them
    - High volume shooters may have a lower percentage
    - Net-front players may have a higher percentage
- If a player’s percentage deviates drastically from their usual, it is usually a result of luck.
    - Players who usually shoot 10% but now shoot 50% will not be able to sustain that for long
    - Players who usually shoot 20% but now shoot 5% have usually not forgotten how to play
- There are genuine reasons for shifts in percentage- context cannot be ignored
    - Injuries can reduce shooting percentage
    - Practice, film study, fitness, or strength training can all lead to improved shooting percentage
    - Changes in tactics or position may result in different shooting opportunities and change shooting percentage

Injury Rate

Team Stat

- Injury Rate = (games players have missed from injury) / (number of games played x number of players on roster)
- A higher than usual injury rate can denote poor “injury luck”
- Can also indicate poor training, fitness, or overly aggressive play

Shot Luck Composite (SLC)

Team Stat

- (Goals / Shots For) + (Goals Against / Shots Against)
- Measured as percentage
- Value for all teams in league will always average to 100- zero-sum stat
- Quality shooters or shot blockers can offset, but exceptionally high values >110) or exceptionally low values (<90) generally indicate luck, and will regress over time back to a normal range over time

Making Adjustments

- Do certain players perform better while on the field together?
- Can you adjust your tactics to maximize a player’s impact?
  - Should an elite offensive producer be moved to forward?
  - Should you try putting a top defender in match-up situations?

Thinking Objectively

- It can be tempting to look for statistics that align with your bias and “prove you right” but it is vital to make decisions from data, not look for data to support decisions
- Without complete certainty, avoid drastic changes